# WeatherExpert™ 48N2,N3,N4,N5,N6,N7,N8,N9 Packaged Rooftop Cooling Units with Gas Heat and *Comfort*Link Controls

# Installation Instructions

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## GENERAL

This installation instruction contains basic unit installation information, including installation of thermostats and remote temperature sensors.

For additional information and service instructions, refer to the Controls, Start-Up, Operation, Service and Troubleshooting literature.

## SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

**⚠ WARNING**

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

**FOR YOUR SAFETY**
**WHAT TO DO IF YOU SMELL GAS**

Do not try to light any appliance. Do not touch any electrical switch; do not use any phone in your building. Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

**FOR YOUR SAFETY**

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

**⚠ WARNING**

Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer, service agency, or the gas supplier.

**⚠ CAUTION**

Disconnect gas piping from units when leak testing at pressures greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in a hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it must be replaced. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, the unit connected to such piping must be isolated by manually closing the gas valve.


**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**


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**⚠ WARNING**

DO NOT USE TORCH to remove any component. System contains oil and refrigerant under pressure.

To remove a component, wear protective gloves and goggles and proceed as follows:

a. Shut off electrical power to unit.
b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
c. Traces of vapor should be displaced with nitrogen and the work area should be well ventilated. Refrigerant in contact with an open flame produces toxic gases.
d. Cut component connection tubing with tubing cutter and remove component from unit. Use a pan to catch any oil that may come out of the lines and as a gage for how much oil to add to the system.
e. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Failure to follow these procedures may result in personal injury or death.

**⚠ CAUTION**

DO NOT re-use compressor oil or any oil that has been exposed to the atmosphere. Dispose of oil per local codes and regulations. DO NOT leave refrigerant system open to air any longer than the actual time required to service the equipment. Seal circuits being serviced and charge with dry nitrogen to prevent oil contamination when timely repairs cannot be completed. Failure to follow these procedures may result in damage to equipment.

## ACOUSTICAL CONSIDERATIONS

In order to minimize sound transmitted to the space, please conform to the following recommendations (see Fig. 1):

### Location

- Avoid locating the unit above sound sensitive areas. Instead, locate the unit above restrooms, storage areas, corridors, or other noise tolerant areas.
- Avoid mounting the unit in the middle of large roof expanses between vertical supports. This will minimize the phenomenon known as roof bounce.
- Install the units close to vertical roof supports (columns or load bearing walls).
- Locate the units at least 25 feet away from critical areas. If this is not possible, the ductwork and ceiling structure should be acoustically treated.
- Consider the use of vibration isolators or an acoustic curb.

### Ductwork

- Utilize flexible connectors between the unit and the supply and return ducts.
- Supply and return air main trunk ducts should be located over hallways and/or public areas.
- Provide trailing edge turning vanes in ductwork elbows and tees to reduce air turbulence.
- Make the ductwork as stiff as possible.
- Use round duct wherever possible because it is less noisy.
- Seal all penetrations around ductwork entering the space.
- Make sure that ceiling and wall contractors do not attach hangers or supports to ductwork.
- Provide as smooth and gradual transition a possible when connecting the rooftop unit discharge to the supply duct.
- If a ceiling plenum return is utilized, provide a return elbow or tee to eliminate line-of-sight noise to the space. Face the entrance of the return duct away from other adjacent units.

### Acoustic Insulation

- Provide acoustic interior lining for first 20 feet of supply and return duct or until the first elbow is encountered. The elbow prevents line-of-sight transmission in the supply and return ducts.
- Install a double layer of 2-in. low density quilted fiberglass acoustical pad with a $^1/_8$-in. barium-loaded vinyl facing on top of the roof deck before building insulation and roofing installation occur. Place the material inside the curb and for 4 to 8 ft beyond the unit perimeter, dependent upon unit size (larger units require a wider apron outside the curb). Openings in the pad should only be large enough for the supply and return ducts. An alternate approach is to use two layers of gypsum board with staggered seams in addition to the acoustical pad.

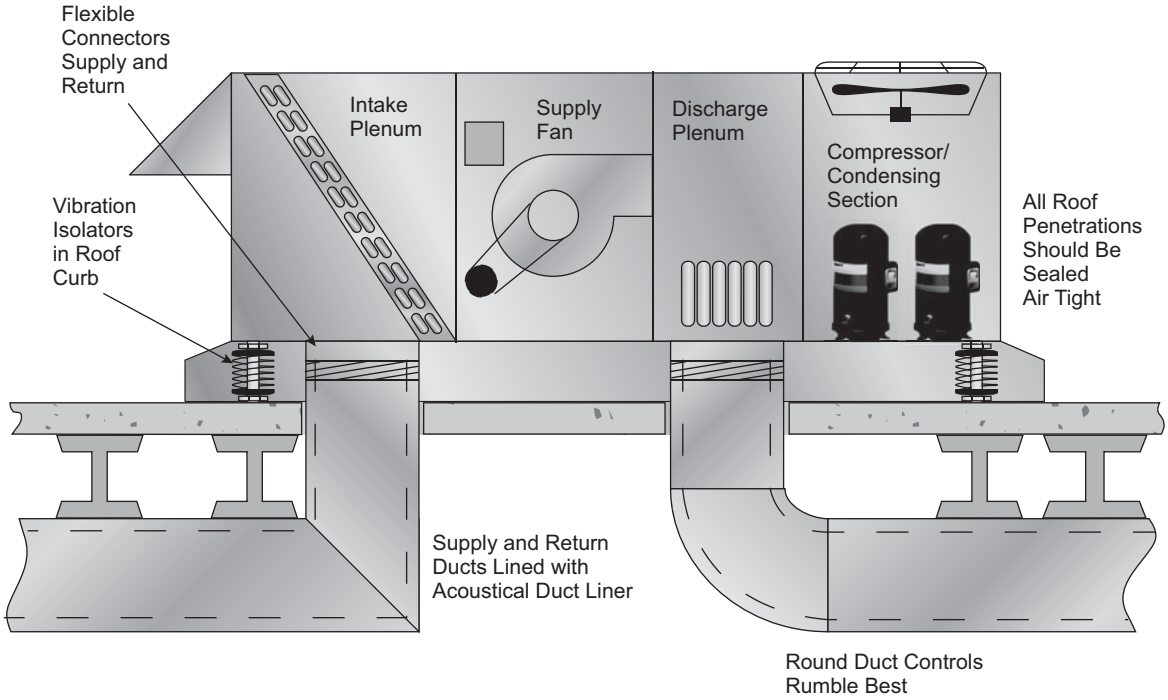

Flexible Connectors Supply and Return
Intake Plenum
Supply Fan
Discharge Plenum
Compressor/ Condensing Section
All Roof Penetrations Should Be Sealed Air Tight
Vibration Isolators in Roof Curb
Supply and Return Ducts Lined with Acoustical Duct Liner
Round Duct Controls Rumble Best

**Fig. 1 — Acoustical Considerations**

## INSTALLATION

**Step 1 — Perform Jobsite Survey —** Complete the following checks before installation.

1. Consult local building codes and the NEC (National Electrical Code) (ANSI/NFPA [American National Standards Institute/National Fire Protection Association] 70) for special installation requirements.
2. Determine unit location (from project plans) or select unit location. Refer to Acoustical Considerations section.
3. Check for possible overhead obstructions which may interfere with unit lifting or rigging.

**⚠ CAUTION**

Do not lift unit with forklift truck. Move unit with overhead rigging only.

**Step 2 — Place Unit —** Inspect unit for transportation damage. If any damge is found, file a claim with the transportation agency.

Provide clearance around and above unit for airflow, safety, and service access. Do not restrict top (area above condenser fans) in any way. Allow at least 6 ft on all sides for rated performance, code compliance, and service. On units equipped with power exhaust option, high velocity air is exhausted out the hood. Unit should be positioned with at least 10 ft clearance between the exhaust hood and any obstruction. See Fig. 2 for multiple unit minimum separation. See Tables 1-6 for additional unit and fan data.

Check unit dimensional drawings on pages 20-24 for unit arrangement and minimum performance and service clearances.

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

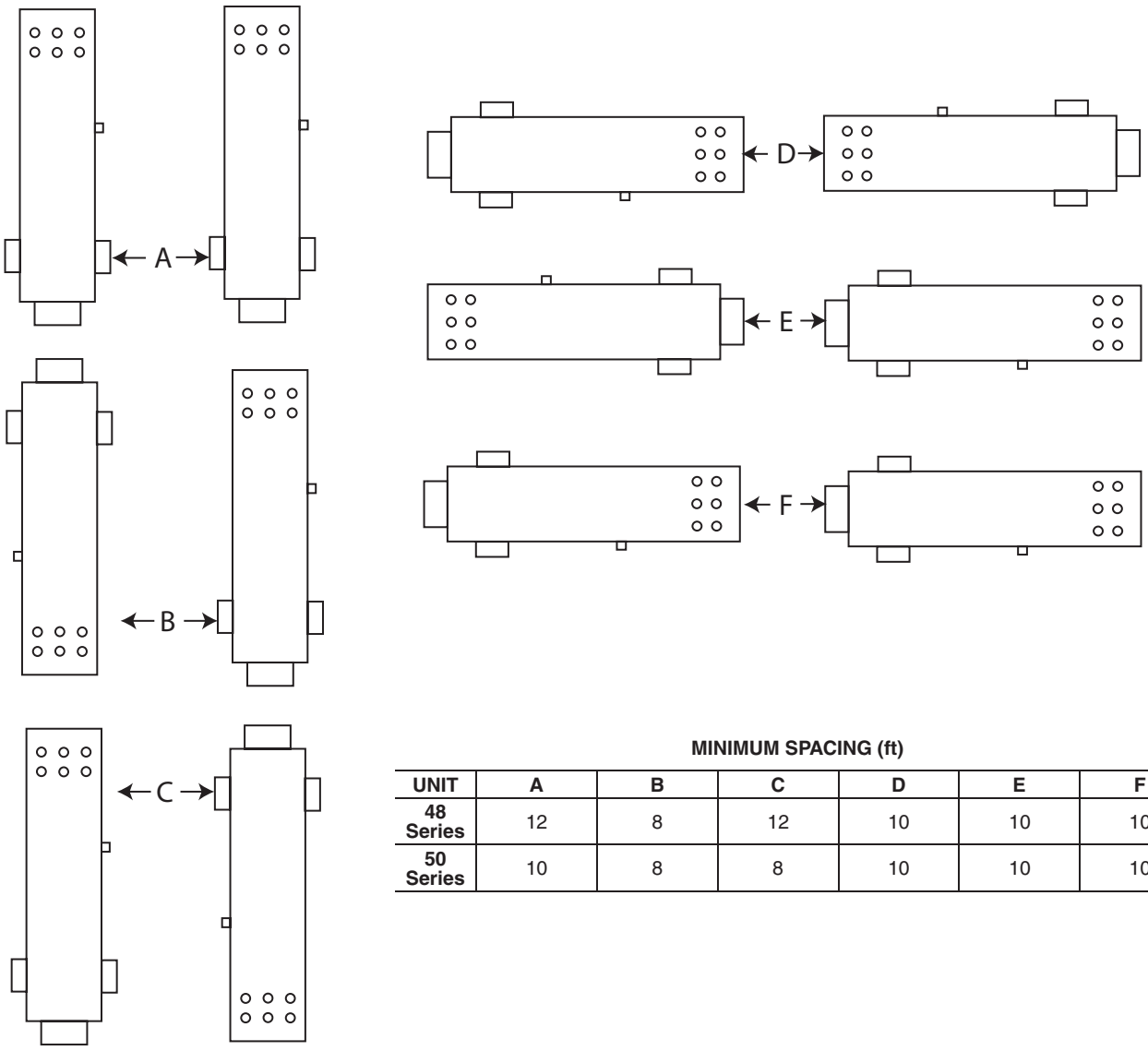
Level by using unit frame as a reference.

**Step 3 — Roof Mount Unit —** Check building codes for weight distribution requirements. Refer to Acoustical Considerations section. Unit and accessory weights are shown in Tables 1and 2. Unit may be mounted on class A, B, or C roofing material.

ROOF CURB — Assemble and install roof curb as described in instructions shipped with the accessory. Accessory roof curb and information required to field fabricate a roof curb is shown in Fig. 3 and 4. Install insulation, cant strips, roofing and counter flashing as required. For unit condensate drain to function properly, curb must be level or within tolerances shown in Fig. 3.

STEEL BEAMS — If roof curb is not used, support unit with steel beams along its entire length and then support steel as required. As a minimum, unit must be supported across its width at each lifting lug location.

**Step 4 — Slab Mount Unit —** Provide a level concrete slab that extends beyond unit cabinet at least 6 inches. Use gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow. Provide a slab minimum 8-in. thick with sufficient height above grade to allow for condensate trap as described in Step 8.




**MINIMUM SPACING (ft)**

| UNIT | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 48 Series | 12 | 8 | 12 | 10 | 10 | 10 |
| 50 Series | 10 | 8 | 8 | 10 | 10 | 10 |

**Fig. 2 — Multiple Unit Minimum Separation**

## Table 1 — Physical Data 48N Sizes N-T (75-150 Tons Nominal Capacity)

| BASE UNIT | N | P | Q | R | S | T |
|---|---|---|---|---|---|---|
| NOMINAL CAPACITY (tons) | 75 | 90 | 105 | 120 | 130 | 150 |
| WEIGHT (lb) | | | | | | |
| Base Unit* | 12,000 | 12,455 | 12,455 | 16,170 | 16,860 | 17,040 |
| Split Unit - Main Section | 9,110 | 9,565 | 9,565 | 12,880 | 13,570 | 13,750 |
| Split Unit - Return Section | 2,890 | 2,890 | 2,890 | 3,290 | 3,290 | 3,290 |
| COMPRESSORS | Scroll | | | | | |
| Quantity | 5 | 6 | 6 | 8 | 8 | 8 |
| Oil Charge (oz) per Compressor | 110 | 110 | 110 | 110 | 110 | 110 |
| Compressor A1 | ZP182 | ZP154 | ZP182 | ZP182 | ZP154 | ZP182 |
| Compressor A2 | ZP182 | ZP154 | ZP182 | ZP154 | ZP182 | ZP182 |
| Compressor A3 | 0 | ZP154 | ZP182 | ZP154 | ZP182 | ZP182 |
| Compressor A4 | 0 | 0 | 0 | ZP154 | ZP182 | ZP182 |
| Compressor B1 | ZP137 | ZP182 | ZP182 | ZP182 | ZP154 | ZP182 |
| Compressor B2 | ZP137 | ZP182 | ZP182 | ZP154 | ZP182 | ZP182 |
| Compressor B3 | ZP137 | ZP182 | ZP182 | ZP154 | ZP182 | ZP182 |
| Compressor B4 | 0 | 0 | 0 | ZP154 | ZP182 | ZP182 |
| Stages of Capacity, % Total Capacity | 0,18,23,41,65, 82,100 | 0,11,15,33,49, 67,82,100 | 0,13,17,33,50, 67,83,100 | 0,11,14,28,40, 52,64,76,88,100 | 0,8,11,22,35, 48,61,74,87,100 | 0,9,13,25,38, 50,63,75,88,90 |
| Number of Refrigerant Circuits | 2 | 2 | 2 | 2 | 2 | 2 |
| REFRIGERANT | | | | | | |
| Type | R-410A | | | | | |
| Charge Amount | See Table 6 | | | | | |
| METERING DEVICE | | | | | | |
| Type... Quantity per Circuit | Electronically controlled expansion devices... two (2) per circuit | | | | | |
| STANDARD EFFICIENCY UNIT CONDENSER | MCHX | | | | | |
| Material | Aluminum | Aluminum | Aluminum | Aluminum | Aluminum | Aluminum |
| Number of Total Coils | 4 | 4 | 4 | 4 | 6 | 6 |
| Total Face Area (sq ft) | 138.7 | 173.3 | 173.3 | 173.3 | 173.3 | 260.0 |
| HIGH EFFICIENCY UNIT CONDENSER | MCHX | | | | | |
| Material | Aluminum | Aluminum | Aluminum | Aluminum | Aluminum | NA |
| Number of Total Coils | 4 | 6 | 6 | 6 | 6 | |
| Total Face Area (sq ft) | 138.7 | 173.3 | 260.0 | 260.0 | 260.0 | |
| EVAP-STANDARD CAPACITY with STD EFFICIENCY | RTPF | | | | | |
| Material | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL |
| Quantity | 2 | 2 | 2 | 2 | 2 | 2 |
| Tube Type | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched |
| Rows (each) | 4 | 4 | 6 | 4 | 6 | 6 |
| FPI | 16 | 16 | 16 | 16 | 16 | 16 |
| Total Face Area (sq ft) | 78.8 | 78.8 | 78.8 | 99.6 | 99.6 | 99.6 |
| EVAP-STANDARD CAPACITY with HIGH EFFICIENCY | RTPF | | | | | |
| Material | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL | NA |
| Quantity | 2 | 2 | 2 | 2 | 2 | |
| Tube Type | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | |
| Rows (each) | 4 | 4 | 6 | 4 | 6 | |
| FPI | 16 | 16 | 16 | 16 | 16 | |
| Total Face Area (sq ft) | 78.8 | 78.8 | 78.8 | 99.6 | 99.6 | |
| EVAP-HIGH CAPACITY with STD EFFICIENCY | RTPF | | | | | |
| Material | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL |
| Quantity | 2 | 2 | 2 | 2 | 2 | 2 |
| Tube Type | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched |
| Rows (each) | 6 | 6 | 8 | 6 | 8 | 8 |
| FPI | 16 | 16 | 16 | 16 | 16 | 16 |
| Total Face Area (sq ft) | 78.8 | 78.8 | 78.8 | 99.6 | 99.6 | 99.6 |
| EVAP-HIGH CAPACITY with HIGH EFFICIENCY | RTPF | | | | | |
| Material | CU-AL | CU-AL | CU-AL | CU-AL | CU-AL | NA |
| Quantity | 2 | 2 | 2 | 2 | 2 | |
| Tube Type | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | Cross Hatched | |
| Rows (each) | 6 | 6 | 8 | 6 | 8 | |
| FPI | 16 | 16 | 16 | 16 | 16 | |
| Total Face Area (sq ft) | 78.8 | 78.8 | 78.8 | 99.6 | 99.6 | |
| CONDENSER FAN, STANDARD EFFICIENCY | | | | | | |
| Number of Fans | 4 | 6 | 6 | 6 | 9 | 9 |
| Type | Prop/Metal | Prop/Metal | Prop/Plastic | Prop/Plastic | Prop/Metal | Prop/Plastic |
| Diameter (in.) | 30.5 | 30 | 30.5 | 30.5 | 30 | 30.5 |
| Motor Hp | 1 | 1 | 1 | 1 | 1 | 1 |
| Nominal Cfm | 41,000 | 81,000 | 81,000 | 81,000 | 93,000 | 122,400 |
| Motor Rpm | 1140 | 1140 | 1140 | 1140 | 1140 | 1140 |
| CONDENSER FAN, HIGH EFFICIENCY | | | | | | |
| Number of Fans | 6 | 9 | 9 | 9 | 9 | NA |
| Type | Prop/Metal | Prop/Plastic | Prop/Plastic | Prop/Plastic | Prop/Plastic | |
| Diameter (in.) | 30.5 | 30.5 | 30.5 | 30.5 | 30.5 | |
| Motor Hp | 1 | 1 | 1 | 1 | 1 | |
| Nominal Cfm | 61,000 | 93,000 | 93,000 | 93,000 | 93,000 | |
| Motor Rpm | 1140 | 1140 | 1140 | 1140 | 1140 | |

LEGEND

**Cu-Al** — Copper-to-Aluminum
**DWDI** — Double Width Double Inlet
**FPI** — Fins per Inch
**MBtuh** — Btuh in Thousands
**MCHX** — Microchannel Heat Exchanger
**RTPF** — Round Tube Plate Fin
**SWSI** — Single Width Single Inlet

* Base unit includes: economizer dampers and hoods, filter tracks less filters, evaporator coil mounting less the evaporator, extended plenum, and standard efficiency condenser. For 75-105 nominal ton units only, base unit weight also includes the short supply fan section.

## Table 1 — Physical Data 48N Sizes N-T (75-150 Tons Nominal Capacity) (cont)

| BASE UNIT | N | P | Q | R | S | T |
|---|---|---|---|---|---|---|
| NOMINAL CAPACITY (tons) | 75 | 90 | 105 | 120 | 130 | 150 |
| HUMIDI-MIZER® COIL | | | | | | |
| Type | MCHX | | | | | |
| Material | Aluminum | | | | | |
| Quantity | 1 | | | | | |
| Surface | E-Coated | | | | | |
| Total Face Area (sq ft) | 34.5 | 43 | 43 | 43 | 43 | 43 |
| STANDARD AND HIGH CAPACITY HOT WATER COILS | | | | | | |
| Type | RTPF | | | | | |
| Material | Aluminum Fin, Copper Tube | | | | | |
| Quantity | 2 | | | | | |
| Tube Type | Smooth | | | | | |
| Rows (each) | 2 | | | | | |
| FPI | 12 | | | | | |
| Total Face Area (sq ft) | | 22.4 | | | 26.4 | |
| STANDARD AND HIGH CAPACITY STEAM COIL | | | | | | |
| Type | RTPF | | | | | |
| Material | Aluminum Fin, Copper Tube, Steel Header, Sloped Casing | | | | | |
| Quantity | 2 | | | | | |
| Tube Type | Smooth | | | | | |
| Connection Size, Length (in.) | 2.50, 3.00 | | | | | |
| Total Face Area (sq ft) | | 40.1 | | | 49.0 | |
| HEATING SECTION LOW (48N ONLY) | | | | | | |
| Heating Section | 2 | 2 | 2 | 3 | 3 | 3 |
| Number of Heat Exchangers | 18 | 18 | 18 | 27 | 27 | 27 |
| Output (MBtuh) | 648 | 648 | 648 | 972 | 972 | 972 |
| Temperature Rise Range (F) | 10-40 | 10-40 | 10-40 | 15-45 | 15-45 | 15-45 |
| Efficiency (%) | 81 | 81 | 81 | 81 | 81 | 81 |
| Burner Orifice Quantity, Diameter (in.), Drill No. | 18, 0.1285, 30 | 18, 0.1285, 30 | 18, 0.1285, 30 | 27, 0.1285, 30 | 27, 0.1285, 30 | 27, 0.1285, 30 |
| Manifold Pressure (in. wg) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Line Pressure (in. wg) (min...max) | 5.8-11 | 5.8-11 | 5.8-11 | 6.2-11 | 6.2-11 | 6.2-11 |
| Firing Stages (Standard) | 2 | 2 | 2 | 2 | 2 | 2 |
| Firing Stages (Modulating) | 14-100% | 14-100% | 14-100% | 9-100% | 9-100% | 9-100% |
| Number of Gas Valves | 2 | 2 | 2 | 3 | 3 | 3 |
| HEATING SECTION MED (48N ONLY) | | | | | | |
| Heating Section | | 3 | 3 | 4 | 4 | 4 |
| Number of Heat Exchangers | | 27 | 27 | 36 | 36 | 36 |
| Input/Output (MBtuh) | | 972 | 972 | 1296 | 1296 | 1296 |
| Temperature Rise Range (F) | | 20-50 | 20-50 | 20-50 | 20-50 | 20-50 |
| Efficiency (%) | | 81 | 81 | 81 | 81 | 81 |
| Burner Orifice Quantity, Diameter (in.), Drill No. | NA | 27, 0.1285, 30 | 27, 0.1285, 30 | 36, 0.1285, 30 | 36, 0.1285, 30 | 36, 0.1285, 30 |
| Manifold Pressure (in. wg) | | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Line Pressure (in. wg) (min...max) | | 6.3-11 | 6.3-11 | 6.2-11 | 6.2-11 | 6.2-11 |
| Firing Stages (Standard) | | 2 | 2 | 2 | 2 | 2 |
| Firing Stages (Modulating) | | 9-100% | 9-100% | 7-100% | 7-100% | 7-100% |
| Number of Gas Valves | | 3 | 3 | 4 | 4 | 4 |
| HEATING SECTION HIGH (48N ONLY) | | | | | | |
| Heating Section | 3 | 4 | 4 | 5 | 5 | 5 |
| Number of Heat Exchangers | 27 | 36 | 36 | 45 | 45 | 45 |
| Input/Output (MBtuh) | 972 | 1296 | 1296 | 1620 | 1620 | 1620 |
| Temperature Rise Range (F) | 20-50 | 25-65 | 25-65 | 25-55 | 25-55 | 25-55 |
| Efficiency (%) | 81 | 81 | 81 | 81 | 81 | 81 |
| Burner Orifice Quantity, Diameter (in.), Drill No. | 27, 0.1285, 30 | 36, 0.1285, 30 | 36, 0.1285, 30 | 45, 0.1285, 30 | 45, 0.1285, 30 | 45, 0.1285, 30 |
| Manifold Pressure (in. wg) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| Line Pressure (in. wg) (min...max) | 6.3-11 | 6.3-11 | 6.3-11 | 6.2-11 | 6.2-11 | 6.2-11 |
| Firing Stages (Standard) | 2 | 2 | 2 | 2 | 2 | 2 |
| Firing Stages (Modulating) | 9-100% | 7-100% | 7-100% | 5-100% | 5-100% | 5-100% |
| Number of Gas Valves | 3 | 4 | 4 | 5 | 5 | 5 |
| SUPPLY FAN | | | | | | |
| Standard Supply Fan | | | | | | |
| Diameter (in.) | | 28 | | | 32 | |
| Wheel and Blade Type | | DWDI Airfoil | | | DWDI Airfoil | |
| Maximum Allowable Cfm | | 42,000 | | | 60,000 | |
| Maximum Allowable Speed (rpm) | | 1,800 | | | 1,550 | |
| Shaft Diameter at Pulley (in.) | | 2.25 | | | 2.5 | |
| High Static Supply Fan | | | | | | |
| Diameter (in.) | | 40 | | | 40 | |
| Wheel and Blade Type | | DWDI Airfoil | | | DWDI Airfoil | |
| Maximum Allowable Cfm | | 52,500 | | | 60,000 | |
| Maximum Allowable Speed (rpm) | | 1,250 | | | 1,250 | |
| Shaft Diameter at Pulley (in.) | | 3 | | | 3 | |

LEGEND

**Cu-Al** — Copper-to-Aluminum
**DWDI** — Double Width Double Inlet
**FPI** — Fins per Inch
**MBtuh** — Btuh in Thousands
**MCHX** — Microchannel Heat Exchanger
**RTPF** — Round Tube Plate Fin
**SWSI** — Single Width Single Inlet

* Base unit includes: economizer dampers and hoods, filter tracks less filters, evaporator coil mounting less the evaporator, extended plenum, and standard efficiency condenser. For 75-105 nominal ton units only, base unit weight also includes the short supply fan section.

## Table 1 — Physical Data 48N Sizes N-T (75-150 Tons Nominal Capacity) (cont)

| BASE UNIT | N | P | Q | R | S | T |
|---|---|---|---|---|---|---|
| NOMINAL CAPACITY (tons) | 75 | 90 | 105 | 120 | 130 | 150 |
| OPTIONAL POWER EXHAUST | | | | | | |
| Power Exhaust | | | | | | |
| Diameter (in.) | 20 | 23 | | | | |
| Wheel and Blade Type | DWDI Forward Curve | | | | | |
| Maximum Allowable Cfm | 42,000 | 60,000 | | | | |
| Maximum Allowable Speed (rpm) | 1,200 | 1,200 | | | | |
| Shaft Diameter at Pulley (in.) | 1.75 | 1.75 | | | | |
| High Static Power Exhaust | | | | | | |
| Diameter (in.) | 36 | | | 40 | | |
| Wheel and Blade Type | DWDI Forward Curve | | | DWDI Forward Curve | | |
| Maximum Allowable Cfm | 42,000 | | | 60,000 | | |
| Maximum Allowable Speed (rpm) | 650 | | | 600 | | |
| Shaft Diameter at Pulley (in.) | 2.5 | | | 3 | | |
| OPTIONAL RETURN FAN | | | | | | |
| Return Fan | | | | | | |
| Diameter (in.) | 40 | | | 40 | | |
| Wheel and Blade Type | SWSI Plenum Airfoil | | | SWSI Plenum Airfoil | | |
| Maximum Allowable Cfm | 52,500 | | | 60,000 | | |
| Maximum Allowable Speed (rpm) | 1236 | | | 1236 | | |
| Shaft Diameter at Pulley (in.) | 2.5 | | | 2.5 | | |
| High Static Return Fan | | | | | | |
| Diameter (in.) | 45 | 50 | | 56 | | |
| Wheel and Blade Type | SWSI Plenum Airfoil | | | | | |
| Maximum Allowable Cfm | 60,000 | 60,000 | | 60,000 | | |
| Maximum Allowable Speed (rpm) | 850 | 780 | | 720 | | |
| Shaft Diameter at Pulley (in.) | 3 | | | | | |
| MIXED AIR FILTERS | | | | | | |
| MERV 7 Pleated Filters | 2 inch, MERV 7 | | | 2 inch, MERV 7 | | |
| Quantity | 28 | | | 28 | | |
| Size (in.) | 20x24x2 | | | 20x25x2 | | |
| MERV 8 Pleated Filters | 4 inch, MERV 8 | | | 4 inch, MERV 8 | | |
| Quantity | 28 | | | 28 | | |
| Size (in.) | 20x24x4 | | | 20x25x4 | | |
| MERV 14 Pleated Filters | 4 inch, MERV 14 | | | 4 inch, MERV 14 | | |
| Quantity | 28 | | | 28 | | |
| Size (in.) | 20x24x4 | | | 20x25x4 | | |
| MERV 14 Cartridge Filters, 2 or 4-in. in Pre-Filters | 12 inch, MERV 14 Cartridge Filters | | | 12 inch, MERV 14 Cartridge Filters | | |
| Quantity | 20 | | | 20 | | |
| Size (in.) | (15) 20x24x12, (5) 24x24x12 | | | 24x24x12 | | |
| MERV 14 Bag, 2 or 4-in. in Pre-Filters | 12 inch, MERV 14 Bag Filters | | | 12 inch, MERV 14 Bag Filters | | |
| Quantity | 20 | | | 20 | | |
| Size (in.) | (15) 20x24x12, (5) 24x24x12 | | | 24x24x12 | | |
| MERV 15 Bag, 2 or 4-in. in Pre-Filters | 19 inch, MERV 15 Bag Filters | | | 19 inch, MERV 15 Bag Filters | | |
| Quantity | 20 | | | 20 | | |
| Size (in.) | (15) 20x24x19, (5) 24x24x19 | | | 24x24x19 | | |
| FINAL FILTERS | | | | | | |
| MERV 14 Cartridge Filters, 2 or 4-in. in Pre-Filters | 12 inch, MERV 14 Cartridge Filters | | | 12 inch, MERV 14 Cartridge Filters | | |
| Quantity | 19 | | | 19 | | |
| Size (in.) | (14) 20x24x12, (5) 24x24x12 | | | 24x24x12 | | |
| MERV 15 Bag, 2 or 4-in. in Pre-Filters | 19 inch, MERV 15 Bag Filters | | | 19 inch, MERV 15 Bag Filters | | |
| Quantity | 19 | | | 19 | | |
| Size (in.) | (14) 20x24x19, (5) 24x24x19 | | | 24x24x19 | | |
| MERV 17 HEPA, 2 or 4-in. in Pre-Filters | 12 inch, MERV 17 HEPA Filters, 99.99% | | | 12 inch, MERV 17 HEPA Filters, 99.99% | | |
| Quantity | 19 | | | 19 | | |
| Size (in.) | (14) 24x12x12, (5) 24x24x12 | | | 24x24x12 | | |
| OUTSIDE AIR SCREENS | | | | | | |
| Standard Hood (Motorized OA and Economizer Options) | Aluminum Frame, Permanent | | | | | |
| Quantity | 12 Screens | | | 16 Screens | | |
| Size (in.) | 16 7/8 x 31 | | | 16 7/8 x 31 | | |

LEGEND

**Cu-Al** — Copper-to-Aluminum
**DWDI** — Double Width Double Inlet
**FPI** — Fins per Inch
**MBtuh** — Btuh in Thousands
**MCHX** — Microchannel Heat Exchanger
**RTPF** — Round Tube Plate Fin
**SWSI** — Single Width Single Inlet

* Base unit includes: economizer dampers and hoods, filter tracks less filters, evaporator coil mounting less the evaporator, extended plenum, and standard efficiency condenser. For 75-105 nominal ton units only, base unit weight also includes the short supply fan section.

## Table 2 — Operating Weights of Options and Accessories (lb)

| OPTION OR ACCESSORY | 48N UNIT SIZE (TON NOMINAL CAPACITY) | | | | | |
|---|---|---|---|---|---|---|
| | N (75) | P (90) | Q (105) | R (120) | S (130) | T (150) |
| **Economizer** | 140 | 140 | 140 | 140 | 140 | 140 |
| **Filters** | | | | | | |
| **2 in. MERV 7** | 90 | 90 | 90 | 100 | 100 | 100 |
| **4 in. MERV 8** | 150 | 150 | 150 | 175 | 175 | 175 |
| **4 in. MERV 14** | 175 | 175 | 175 | 210 | 210 | 210 |
| **12 in. MERV 14 Bag with 2 in. Pre-Filter** | 200 | 200 | 200 | 225 | 225 | 225 |
| **12 in. MERV 14 Bag with 4 in. Pre-Filter** | 260 | 260 | 260 | 300 | 300 | 300 |
| **19 in. MERV 15 Bag with 2 in. Pre-Filter** | 300 | 300 | 300 | 335 | 335 | 335 |
| **19 in. MERV 15 Bag with 4 in. Pre-Filter** | 320 | 320 | 320 | 350 | 350 | 350 |
| **12 in. MERV 14 Cartridge with 2 in. Pre-Filter** | 350 | 350 | 350 | 375 | 375 | 375 |
| **12 in. MERV 14 Cartridge with 4 in. Pre-Filter** | 370 | 370 | 370 | 400 | 400 | 400 |
| **Field Use Filter Section** | 635 | 635 | 635 | 665 | 665 | 665 |
| **Evaporator** | | | | | | |
| **Standard Capacity** | 625 | 625 | 832 | 795 | 1053 | 1053 |
| **High Capacity** | 832 | 832 | 1110 | 1053 | 1402 | 1402 |
| **High-Efficiency Condenser** | 310 | 691 | 691 | 691 | None | NA |
| **Extended Chassis** | 320 | 320 | 320 | 335 | 335 | 335 |
| **Humidi-MiZer® Dehumidification System** | 475 | 495 | 495 | 510 | 510 | 510 |
| **Gas Heat** | | | | | | |
| **Low** | 937 | 937 | 937 | 1099 | 1099 | 1099 |
| **Medium** | NA | 1067 | 1067 | 1229 | 1229 | 1229 |
| **High** | 1067 | 1197 | 1197 | 1469 | 1469 | 1469 |
| **Modulating** | 50 | 50 | 50 | 50 | 50 | 50 |
| **Blank Section** | | | | | | |
| **4 ft** | 530 | 530 | 530 | 555 | 555 | 555 |
| **8 ft** | 1060 | 1060 | 1060 | 1110 | 1110 | 1110 |
| **Post Filters** | | | | | | |
| **19 in. MERV 15 Bag with 2 in. Pre-Filter** | 830 | 830 | 830 | 890 | 890 | 890 |
| **19 in. MERV 15 Bag with 4 in. Pre-Filter** | 850 | 850 | 850 | 905 | 905 | 905 |
| **12 in. MERV 14 Cart with 2 in. Pre-Filter** | 880 | 880 | 880 | 930 | 930 | 930 |
| **12 in. MERV 14 Cart with 4 in. Pre-Filter** | 900 | 900 | 900 | 955 | 955 | 955 |
| **12 in. MERV 17 HEPA with 2 in. Pre-Filter** | 905 | 905 | 905 | 965 | 965 | 965 |
| **12 in. MERV 17 HEPA with 4 in. Pre-Filter** | 930 | 930 | 930 | 980 | 980 | 980 |
| **Supply Fan** | | | | | | |
| **High-Static Supply Fan** | 1274 | 1274 | 1274 | 1169 | 1169 | 1169 |
| **Standard Supply Fan** | 965 | 965 | 965 | 1071 | 1071 | 1071 |
| **PE (Power Exhaust) Fan** | | | | | | |
| **High-Static PE Fan** | 927 | 927 | 927 | 927 | 927 | 927 |
| **Standard PE Fan** | 619 | 727 | 727 | 727 | 727 | 727 |
| **Return Fan** | | | | | | |
| **High-Static Return Fan** | 974 | 1086 | 1298 | 1298 | 1298 | 1298 |
| **Standard Return Fan** | 895 | 895 | 895 | 895 | 895 | 895 |
| **Supply/PE/Return Motor Includes VFD** | | | | | | |
| **460 Volt ODP** | | | | | | |
| **7.5 Hp** | 183 | 183 | 183 | 183 | 183 | 183 |
| **10 Hp** | 209 | 209 | 209 | 209 | 209 | 209 |
| **15 Hp** | 320 | 320 | 320 | 320 | 320 | 320 |
| **20 Hp** | 374 | 374 | 374 | 374 | 374 | 374 |
| **25 Hp** | 417 | 417 | 417 | 417 | 417 | 417 |
| **30 Hp** | 456 | 456 | 456 | 456 | 456 | 456 |
| **40 Hp** | 697 | 697 | 697 | 697 | 697 | 697 |
| **50 Hp** | 784 | 784 | 784 | 784 | 784 | 784 |
| **60 Hp** | 897 | 897 | 897 | 897 | 897 | 897 |
| **75 Hp** | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 |
| **100 Hp** | 1488 | 1488 | 1488 | 1488 | 1488 | 1488 |

LEGEND

**ODP** — Open Drip Proof
**TEFC** — Totally Enclosed, Fan Cooled
**VFD** — Variable Frequency Drive

NOTE: Please refer to E-CAT for selection.

## Table 2 — Operating Weights of Options and Accessories (lb) (cont)

| OPTION OR ACCESSORY | 48N UNIT SIZE (TON NOMINAL CAPACITY) | | | | | |
|---|---|---|---|---|---|---|
| | N (75) | P (90) | Q (105) | R (120) | S (130) | T (150) |
| **Supply/PE/Return Motor Includes VFD 460 Volt TEFC** | | | | | | |
| 7.5 Hp | 267 | 267 | 267 | 267 | 267 | 267 |
| 10 Hp | 283 | 283 | 283 | 283 | 283 | 283 |
| 15 Hp | 368 | 368 | 368 | 368 | 368 | 368 |
| 20 Hp | 437 | 437 | 437 | 437 | 437 | 437 |
| 25 Hp | 576 | 576 | 576 | 576 | 576 | 576 |
| 30 Hp | 604 | 604 | 604 | 604 | 604 | 604 |
| 40 Hp | 991 | 991 | 991 | 991 | 991 | 991 |
| 50 Hp | 925 | 925 | 925 | 925 | 925 | 925 |
| 60 Hp | 1163 | 1163 | 1163 | 1163 | 1163 | 1163 |
| 75 Hp | 1275 | 1275 | 1275 | 1275 | 1275 | 1275 |
| 100 Hp | 1488 | 1488 | 1488 | 1488 | 1488 | 1488 |
| **Supply/PE/Return Motor Includes VFD 575 Volt ODP** | | | | | | |
| 7.5 Hp | 186 | 186 | 186 | 186 | 186 | 186 |
| 10 Hp | 204 | 204 | 204 | 204 | 204 | 204 |
| 15 Hp | 327 | 327 | 327 | 327 | 327 | 327 |
| 20 Hp | 369 | 369 | 369 | 369 | 369 | 369 |
| 25 Hp | 433 | 433 | 433 | 433 | 433 | 433 |
| 30 Hp | 456 | 456 | 456 | 456 | 456 | 456 |
| 40 Hp | 697 | 697 | 697 | 697 | 697 | 697 |
| 50 Hp | 784 | 784 | 784 | 784 | 784 | 784 |
| 60 Hp | 897 | 897 | 897 | 897 | 897 | 897 |
| 75 Hp | 1194 | 1194 | 1194 | 1194 | 1194 | 1194 |
| 100 Hp | 1488 | 1488 | 1488 | 1488 | 1488 | 1488 |
| **Supply/PE/Return Motor Includes VFD 575 Volt TEFC** | | | | | | |
| 7.5 Hp | 228 | 228 | 228 | 228 | 228 | 228 |
| 10 Hp | 277 | 277 | 277 | 277 | 277 | 277 |
| 15 Hp | 382 | 382 | 382 | 382 | 382 | 382 |
| 20 Hp | 436 | 436 | 436 | 436 | 436 | 436 |
| 25 Hp | 616 | 616 | 616 | 616 | 616 | 616 |
| 30 Hp | 652 | 652 | 652 | 652 | 652 | 652 |
| 40 Hp | 795 | 795 | 795 | 795 | 795 | 795 |
| 50 Hp | 897 | 897 | 897 | 897 | 897 | 897 |
| 60 Hp | 933 | 933 | 933 | 933 | 933 | 933 |
| 75 Hp | 1194 | 1194 | 1194 | 1194 | 1194 | 1194 |
| 100 Hp | 1488 | 1488 | 1488 | 1488 | 1488 | 1488 |
| **Supply/PE/Return Motor Includes VFD Bypass** | | | | | | |
| 7.5 Hp | 10 | 10 | 10 | 10 | 10 | 10 |
| 10 Hp | 10 | 10 | 10 | 10 | 10 | 10 |
| 15 Hp | 10 | 10 | 10 | 10 | 10 | 10 |
| 20 Hp | 20 | 20 | 20 | 20 | 20 | 20 |
| 25 Hp | 20 | 20 | 20 | 20 | 20 | 20 |
| 30 Hp | 40 | 40 | 40 | 40 | 40 | 40 |
| 40 Hp | 40 | 40 | 40 | 40 | 40 | 40 |
| 50 Hp | 40 | 40 | 40 | 40 | 40 | 40 |
| 60 Hp | 40 | 40 | 40 | 40 | 40 | 40 |
| 75 Hp | 60 | 60 | 60 | 60 | 60 | 60 |
| 100 Hp | 75 | 75 | 75 | 75 | 75 | 75 |
| **Condenser Grilles** | | | | | | |
| Standard Efficiency | 100 | 100 | 100 | 100 | 125 | 125 |
| High Efficiency | 100 | 125 | 125 | 125 | 125 | NA |
| **Condenser Louvers** | | | | | | |
| Standard Efficiency | 225 | 225 | 225 | 225 | 290 | 290 |
| High Efficiency | 225 | 290 | 290 | 290 | 290 | NA |
| **Service Valves and Replacable Core Filter Drier** | 40 | 45 | 45 | 50 | 50 | 50 |
| **Low Ambient** | 50 | 50 | 50 | 50 | 50 | 50 |
| **UV Lights** | 100 | 100 | 100 | 130 | 130 | 130 |
| **Marine Lights** | 75 | 75 | 75 | 75 | 75 | 75 |
| **Split - 2 Piece Unit** | 268 | 268 | 268 | 280 | 280 | 280 |

LEGEND

**ODP** — Open Drip Proof
**TEFC** — Totally Enclosed, Fan Cooled
**VFD** — Variable Frequency Drive

NOTE: Please refer to E-CAT for selection.

## Table 3 — Supply Fan and Drive Data

| FAN | MOTOR HP | MOTOR RPM | MOTOR SHAFT SIZE (in.) | FAN RPM | FAN SHAFT SIZE (in.) | DRIVE SHEAVE BROWNING | BUSHING TYPE | DRIVEN SHEAVE BROWNING | BUSHING TYPE | BELTS | QTY OF BELTS | FAN SPEED (rpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Fan 75-105 Tons Nominal Capacity | 50 | 1770 | 2.125 | 1800 | 2.25 | 4B5V70 | B 2 1/8 | 4B5V68 | B 2 1/4 | 5VX530 | 4 | 1821/1821 |
| | 40 | 1770 | 2.125 | 1600 | | 3B5V68 | B 2 1/8 | 3B5V74 | B 2 1/4 | 5VX540 | 3 | 1628/1628 |
| | 30 | 1765 | 1.875 | 1450 | | 3B5V70 | B 1 7/8 | 3B5V86 | B 2 1/4 | BX55 | 3 | 1448/1448 |
| | 25 | 1765 | 1.875 | 1400 | | 3B5V64 | B 1 7/8 | 3B5V80 | B 2 1/4 | BX53 | 3 | 1425/1425 |
| | 20 | 1765 | 1.625 | 1250 | | 3B5V56 | B 1 5/8 | 3B5V80 | B 2 1/4 | BX53 | 3 | 1255/1255 |
| Standard Fan 120-150 Tons Nominal Capacity | 60 | 1775 | 2.375 | 1550 | 2.5 | 4B5V70 | B 2 3/8 | 4R5V80 | R1 2 1/2 | 5VX600 | 4 | 1595/1595 |
| | 50 | 1770 | 2.125 | 1400 | | 4B5V70 | B 2 1/8 | 4R5V90 | R1 2 1/2 | 5VX630 | 4 | 1412/1412 |
| | 40 | 1770 | 2.125 | 1300 | | 3B5V68 | B 2 1/8 | 3R5V92 | R1 2 1/2 | 5VX630 | 3 | 1328/1328 |
| | 30 | 1765 | 1.875 | 1200 | | 3B5V70 | B 1 7/8 | 3R5V103 | R1 2 1/2 | 5VX670 | 3 | 1229/1229 |
| | 25 | 1765 | 1.875 | 1100 | | 3B5V64 | B 1 7/8 | 3R5V103 | R1 2 1/2 | 5VX660 | 3 | 1125/1125 |
| High Static 75-150 Tons Nominal Capacity | 100 | 1775 | 2.875 | 1250 | 3 | 5R5V90 | R1 2 7/8 | 5B5V124 | R1 3 | 5VX830 | 5 | 1264/1264 |
| | 75 | 1775 | 2.375 | 1100 | | 4B5V80 | B 2 3/8 | 4R5V132 | R1 3 | 5VX840 | 4 | 1098/1098 |
| | 60 | 1775 | 2.375 | 1050 | | 4B5V70 | B 2 3/8 | 4R5V118 | R1 3 | 5VX800 | 4 | 1077/1077 |
| | 50 | 1770 | 2.125 | 1000 | | 4B5V70 | B 2 1/8 | 4R5V125 | R1 3 | 5VX830 | 4 | 1013/1013 |
| | 40 | 1770 | 2.125 | 900 | | 3B5V68 | B 2 1/8 | 3R5V140 | R1 3 | 5VX850 | 3 | 918/918 |
| | 30 | 1765 | 1.875 | 800 | | 3B5V70 | B 1 7/8 | 3B154R | R1 3 | BX88 | 3 | 821/821 |
| | 25 | 1765 | 1.875 | 750 | | 3B5V64 | B 1 7/8 | 3B154R | R1 3 | BX87 | 3 | 753/753 |

## Table 4 — Power Exhaust Fan and Drive Data

| FAN | MOTOR HP | MOTOR RPM | MOTOR SHAFT SIZE (in.) | FAN RPM | FAN SHAFT SIZE (in.) | DRIVE SHEAVE BROWNING | BUSHING TYPE | DRIVEN SHEAVE BROWNING | BUSHING TYPE | BELTS | QTY OF BELTS | FAN SPEED (rpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Fan 75 Tons Nominal Capacity | 30 | 1765 | 1.875 | 1200 | 1.75 | 3B5V70 | B 1 7/8 | 3R5V103 | R1 1 3/4 | 5VX570 | 3 | 1229/1229 |
| | 25 | 1765 | 1.875 | 1150 | | 3B5V64 | B 1 7/8 | 3R5V103 | R1 1 3/4 | 5VX560 | 3 | 1125/1125 |
| | 20 | 1765 | 1.625 | 1125 | | 3B5V56 | B 1 5/8 | 3B5V90 | B 1 3/4 | BX52 | 3 | 1120/1120 |
| | 15 | 1770 | 1.625 | 1100 | | 2B5V64 | B 1 5/8 | 2Q5V103 | Q1 1 3/4 | 5VX580 | 2 | 1128/1128 |
| | 10 | 1755 | 1.375 | 1100 | | 2BK52H | H 1 3/8 | 2B5V74 | B 1 3/4 | BX51 | 2 | 1117/1117 |
| | 7.5 | 1760 | 1.375 | 1100 | | 2BK52H | H 1 3/8 | 2B5V74 | B 1 3/4 | BX51 | 2 | 1120/1120 |
| Standard Fan 90-150 Tons Nominal Capacity | 50 | 1770 | 2.125 | 1200 | 1.75 | 4B5V70 | B 2 1/8 | 4R5V103 | R1 1 3/4 | 5VX540 | 4 | 1225/1225 |
| | 40 | 1770 | 2.125 | 1175 | | 3B5V68 | B 2 1/8 | 3R5V103 | R1 1 3/4 | 5VX540 | 3 | 1197/1197 |
| | 30 | 1765 | 1.875 | 1150 | | 3B5V70 | B 1 7/8 | 3B5V110 | B 1 3/4 | 5VX580 | 3 | 1129/1129 |
| | 25 | 1765 | 1.875 | 1125 | | 3B5V64 | B 1 7/8 | 3R5V103 | R1 1 3/4 | 5VX550 | 3 | 1125/1125 |
| | 20 | 1765 | 1.625 | 1100 | | 3B5V56 | B 1 5/8 | 3B5V90 | B 1 3/4 | BX52 | 3 | 1120/1120 |
| | 15 | 1770 | 1.625 | 1050 | | 2B5V64 | B 1 5/8 | 2B5V110 | B 1 3/4 | 5VX590 | 2 | 1036/1036 |
| | 10 | 1755 | 1.375 | 1000 | | 2BK52H | H 1 3/8 | 2B5V80 | B 1 3/4 | BX51 | 2 | 1036/1036 |
| | 7.5 | 1760 | 1.375 | 950 | | 2BK52H | H 1 3/8 | 2B5V90 | B 1 3/4 | BX53 | 2 | 927/927 |
| High Static 75-090 Tons Nominal Capacity | 40 | 1770 | 2.125 | 650 | 2.5 | 3B5V68 | B 2 1/8 | 35V1870E | E 2 1/2 | 5VX830 | 3 | 657/657 |
| | 30 | 1765 | 1.875 | 625 | | 3B5V70 | B 1 7/8 | 3TB200 | Q1 2 1/2 | BX86 | 3 | 635/635 |
| | 25 | 1765 | 1.875 | 600 | | 3B5V64 | B 1 7/8 | 3TB200 | Q1 2 1/2 | BX85 | 3 | 583/583 |
| | 20 | 1765 | 1.625 | 550 | | 3B5V56 | B 1 5/8 | 3TB184 | Q1 2 1/2 | BX82 | 3 | 557/557 |
| | 15 | 1770 | 1.625 | 500 | | 2B5V64 | B 1 5/8 | 25V2360E | E 2 1/2 | 5VX950 | 2 | 490/490 |
| | 10 | 1755 | 1.375 | 450 | | 2BK52H | H 1 3/8 | 2TB184 | Q1 2 1/2 | BX82 | 2 | 460/460 |
| | 7.5 | 1760 | 1.375 | 425 | | 2BK52H | H 1 3/8 | 2TB184 | Q1 2 1/2 | AX81 | 2 | 425/425 |
| High Static 105-150 Tons Nominal Capacity | 60 | 1775 | 2.375 | 600 | 3 | 4B5V70 | B 2 3/8 | 4R5V212 | R1 3 | 5VX930 | 4 | 597/597 |
| | 50 | 1770 | 2.125 | 575 | | 4B5V70 | B 2 1/8 | 4R5V212 | R1 3 | 5VX950 | 4 | 596/596 |
| | 40 | 1770 | 2.125 | 550 | | 3B5V68 | B 2 1/8 | 3R5V212 | R1 3 | 5VX930 | 3 | 579/579 |
| | 30 | 1765 | 1.875 | 525 | | 3B5V70 | B 1 7/8 | 3B250R | R1 3 | BX103 | 3 | 509/509 |
| | 25 | 1765 | 1.875 | 500 | | 3B5V64 | B 1 7/8 | 35V2360E | E 3 | 5VX1000 | 3 | 488/488 |
| | 20 | 1765 | 1.625 | 450 | | 3B5V56 | B 1 5/8 | 35V2360E | E 3 | 5VX1000 | 3 | 428/428 |
| | 15 | 1770 | 1.625 | 400 | | 2B5V64 | B 1 5/8 | 2B300R | R1 3 | BX112 | 2 | 391/391 |

## Table 5 — Return Fan Drive Data

| FAN | MOTOR HP | MOTOR RPM | MOTOR SHAFT SIZE (in.) | FAN RPM | FAN SHAFT SIZE (in.) | DRIVE SHEAVE BROWNING | BUSHING TYPE | DRIVEN SHEAVE BROWNING | BUSHING TYPE | BELTS | QTY OF BELTS | FAN SPEED (rpm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard Return Fan All Sizes | 50 | 1770 | 2.125 | 1236 | 2.5 | 4B5V70 | B 2 1/8 | 4R5V103 | R1 2 1/2 | 5VX1000 | 4 | 1232/1232 |
| | 40 | 1770 | 2.125 | 1149 | | 3B5V68 | B 2 1/8 | 3R5V109 | R1 2 1/2 | 5VX1000 | 3 | 1131/1131 |
| | 30 | 1765 | 1.875 | 1025 | | 3B5V70 | B 1 7/8 | 3TB124 | Q1 2 1/2 | BX98 | 3 | 1015/1015 |
| | 25 | 1765 | 1.875 | 940 | | 3B5V64 | B 1 7/8 | 3TB124 | Q1 2 1/2 | BX98 | 3 | 931/931 |
| | 20 | 1765 | 1.625 | 930 | | 3B5V56 | B 1 5/8 | 3TB110 | Q1 2 1/2 | BX93 | 3 | 922/922 |
| | 15 | 1770 | 1.625 | 890 | | 2B5V64 | B 1 5/8 | 2Q5V132 | Q1 2 1/2 | 5VX1000 | 2 | 878/878 |
| | 10 | 1755 | 1.375 | 770 | | 2BK52H | H 1 3/8 | 2TB110 | Q1 2 1/2 | BX90 | 2 | 761/761 |
| | 7.5 | 1760 | 1.375 | 720 | | 2BK52H | H 1 3/8 | 2TB110 | Q1 2 1/2 | AX89 | 2 | 717/717 |
| High Static Return Fan 75 Tons Nominal Capacity | 30 | 1765 | 1.875 | 850 | 3 | 3B5V70 | B 1 7/8 | 3R5V150 | R1 3 | 5VX1120 | 3 | 841/841 |
| | 25 | 1765 | 1.875 | 825 | | 3B5V64 | B 1 7/8 | 3R5V140 | R1 3 | 5VX1120 | 3 | 825/825 |
| | 15 | 1770 | 1.625 | 680 | | 2B5V64 | B 1 5/8 | 2B160R | R1 3 | BX112 | 2 | 728/728 |
| | 10 | 1755 | 1.375 | 600 | | 2BK52H | H 1 3/8 | 2B154R | R1 3 | BX105 | 2 | 548/548 |
| | 7.5 | 1760 | 1.375 | 550 | | 2BK52H | H 1 3/8 | 2B154R | R1 3 | BX105 | 2 | 549/549 |
| High Static Return Fan 90 Tons Nominal Capacity | 40 | 1770 | 2.125 | 780 | 3 | 3B5V68 | B 2 1/8 | 3R5V160 | R1 3 | 5VX1230 | 3 | 768/768 |
| | 30 | 1765 | 1.875 | 750 | | 3B5V70 | B 1 7/8 | 3B160R | R1 3 | BX120 | 3 | 790/790 |
| | 25 | 1765 | 1.875 | 720 | | 3B5V64 | B 1 7/8 | 3B160R | R1 3 | BX120 | 3 | 725/725 |
| | 20 | 1765 | 1.625 | 650 | | 3B5V56 | B 1 5/8 | 3B154R | R1 3 | BX113 | 3 | 663/663 |
| | 15 | 1770 | 1.625 | 600 | | 2B5V64 | B 1 5/8 | 2B200R | R1 3 | BX123 | 2 | 584/584 |
| | 10 | 1755 | 1.375 | 520 | | 2BK52H | H 1 3/8 | 2B160R | R1 3 | BX112 | 2 | 528/528 |
| | 7.5 | 1760 | 1.375 | 480 | | 2BK52H | H 1 3/8 | 2B184R | R1 3 | BX116 | 2 | 461/461 |
| High Static Return Fan 105-150 Tons Nominal Capacity | 60 | 1775 | 2.375 | 720 | 3 | 4B5V70 | B 2 3/8 | 4B174R | R1 3 | BX133 | 4 | 693/693 |
| | 50 | 1770 | 2.125 | 680 | | 4B5V70 | B 2 1/8 | 45V1870E | E 3 | 5VX1320 | 4 | 676/676 |
| | 40 | 1770 | 2.125 | 650 | | 3B5V68 | B 2 1/8 | 35V1870E | E 3 | 5VX1320 | 3 | 657/657 |
| | 30 | 1765 | 1.875 | 580 | | 3B5V70 | B 1 7/8 | 3R5V212 | R1 3 | 5VX1400 | 3 | 594/594 |
| | 25 | 1765 | 1.875 | 550 | | 3B5V64 | B 1 7/8 | 3B200R | R1 3 | AX128 | 3 | 555/555 |
| | 20 | 1765 | 1.625 | 500 | | 3B5V56 | B 1 5/8 | 3B200R | R1 3 | BX128 | 3 | 513/513 |
| | 15 | 1770 | 1.625 | 450 | | 2B5V64 | B 1 5/8 | 2B250R | R1 3 | AX136 | 2 | 444/444 |
| | 10 | 1755 | 1.375 | 400 | | 2BK52H | H 1 3/8 | 2B200R | R1 3 | AX128 | 2 | 392/392 |

## Table 6 — Refrigerant Charge

| UNIT SIZE (NOMINAL CAPACITY, TONS) | UNIT CONFIGURATION | CHARGE (LB) UNITS WITHOUT HUMIDI-MIZER® SYSTEM | | CHARGE (LB) UNITS WITH HUMIDI-MIZER® SYSTEM | |
|---|---|---|---|---|---|
| | | Circuit A | Circuit B | Circuit A | Circuit B |
| N (75) | Standard Capacity Standard Efficiency | 46.5 | 52.6 | 46.5 | 69.6 |
| | High Capacity Standard Efficiency | 62.9 | 69.0 | 62.9 | 86.0 |
| | Standard Capacity High Efficiency | 50.2 | 56.5 | 50.2 | 73.5 |
| | High Capacity High Efficiency | 67.0 | 73.5 | 67.0 | 90.5 |
| P (90) | Standard Capacity Standard Efficiency | 55.4 | 52.0 | 55.4 | 71.5 |
| | High Capacity Standard Efficiency | 67.8 | 68.5 | 67.8 | 88.3 |
| | Standard Capacity High Efficiency | 59.0 | 57.2 | 59.0 | 76.7 |
| | High Capacity High Efficiency | 73.8 | 73.8 | 73.8 | 94.0 |
| Q (105) | Standard Capacity Standard Efficiency | 71.5 | 67.9 | 71.5 | 87.4 |
| | High Capacity Standard Efficiency | 89.5 | 81.9 | 89.5 | 101.4 |
| | Standard Capacity High Efficiency | 77.5 | 72.9 | 77.5 | 92.4 |
| | High Capacity High Efficiency | 91.6 | 88.2 | 91.6 | 107.7 |
| R (120) | Standard Capacity Standard Efficiency | 59.9 | 57.1 | 59.9 | 76.6 |
| | High Capacity Standard Efficiency | 80.3 | 77.1 | 80.3 | 96.6 |
| | Standard Capacity High Efficiency | 66.5 | 63.3 | 66.5 | 82.8 |
| | High Capacity High Efficiency | 87.1 | 83.3 | 87.1 | 102.8 |
| S (130) | Standard Capacity Standard Efficiency | 84.9 | 81.2 | 84.9 | 100.7 |
| | High Capacity Standard Efficiency | 106.0 | 99.5 | 106.0 | 119.0 |
| | Standard Capacity High Efficiency | 84.5 | 80.7 | 84.5 | 100.2 |
| | High Capacity High Efficiency | 105.5 | 99.0 | 105.5 | 118.5 |
| T (150) | Standard Capacity Standard Efficiency | 82.5 | 82.0 | 82.5 | 101.5 |
| | High Capacity Standard Efficiency | 103.5 | 101.2 | 103.5 | 121.7 |

NOTES:
1. ROOF CURB ACCESSORY CRRFCUBB201A00-285A00 ARE SHIPPED DISASSEMBLED.
2. ROOF CURB: 14 GA.[VA03-561 STL.
3. DIMENSIONS ARE SHOWN IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
4. CROSS SUPPORTS EQUALLY SPACED APPROX 5′-6″ APART

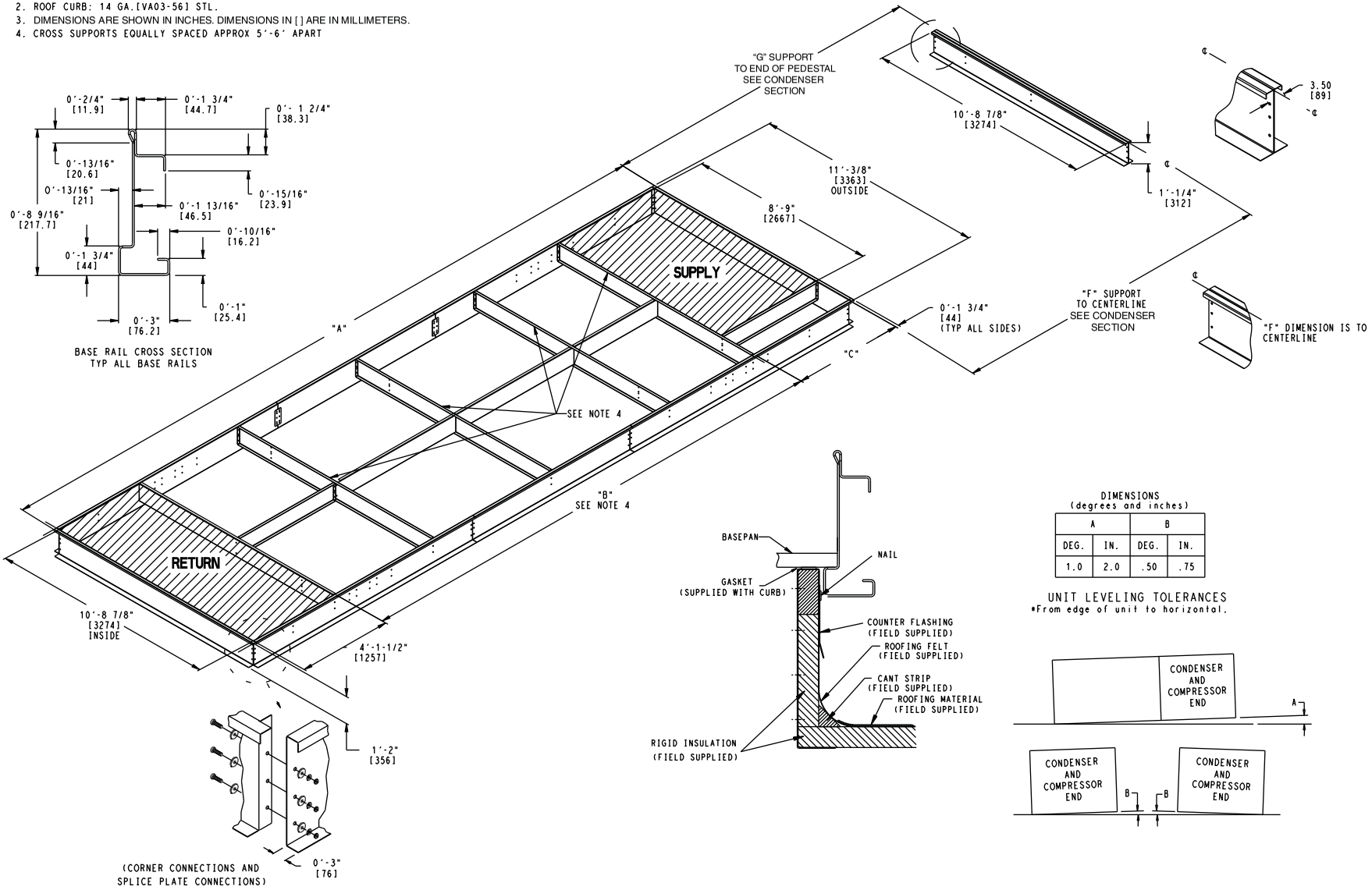



**Fig. 3 — Roof Curb**

**48N Roof Curb Sizes N, P, Q**
**(75-105 Ton Nominal Capacity)**

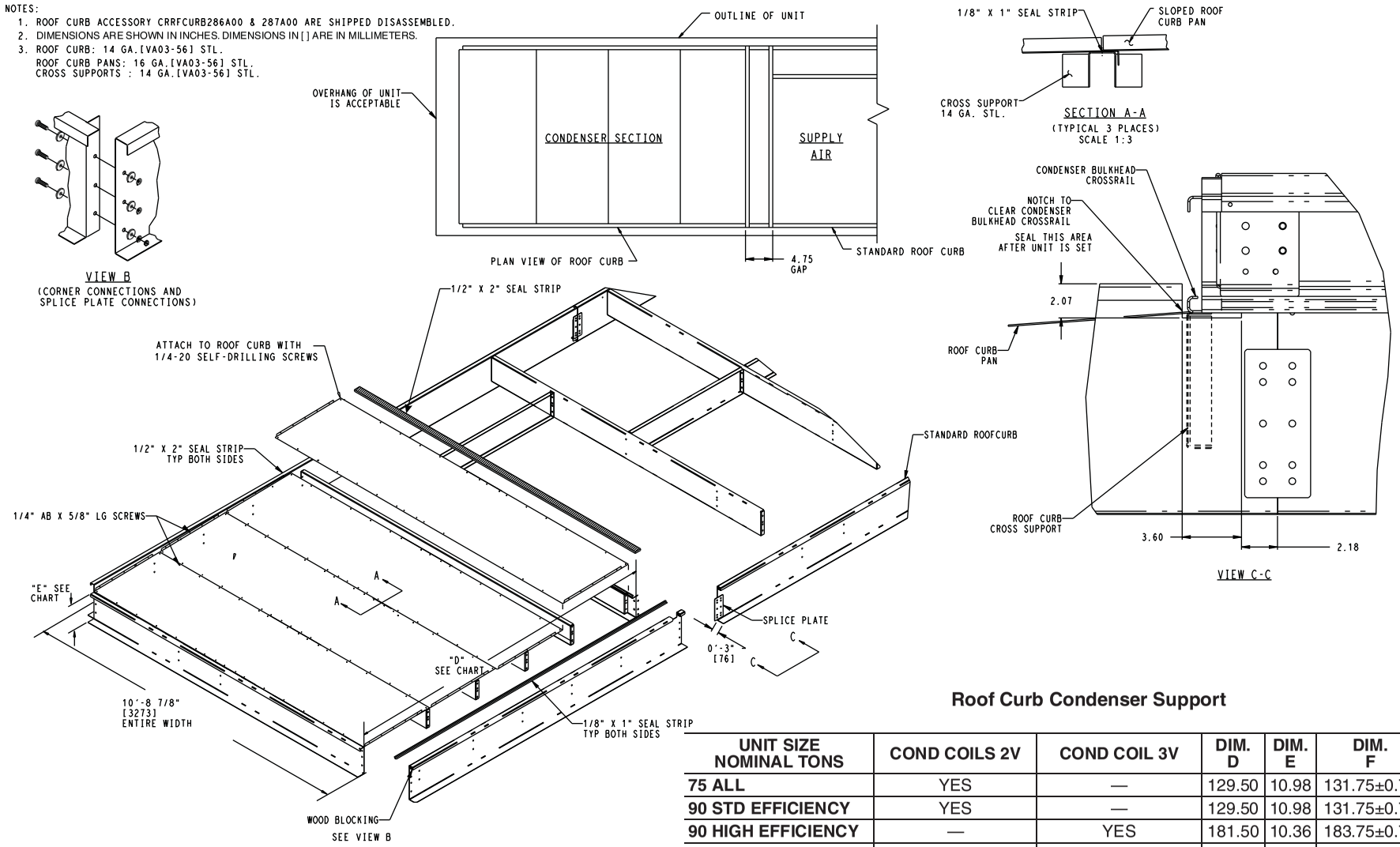
| PART NUMBER* | DIMENSION A (in.) | DIMENSION B (in.) | DIMENSION C (in.) |
|---|---|---|---|
| **CRRFCURB225A00** | 361.11 | 258.61 | 49.50 |
| **CRRFCURB226A00** | 376.20 | 273.70 | 49.50 |
| **CRRFCURB227A00** | 385.11 | 282.61 | 49.50 |
| **CRRFCURB228A00** | 400.20 | 297.70 | 49.50 |
| **CRRFCURB229A00** | 427.61 | 325.11 | 49.50 |
| **CRRFCURB230A00** | 439.86 | 337.36 | 49.50 |
| **CRRFCURB231A00** | 442.70 | 340.20 | 49.50 |
| **CRRFCURB232A00** | 451.61 | 349.11 | 49.50 |
| **CRRFCURB233A00** | 454.95 | 352.45 | 49.50 |
| **CRRFCURB234A00** | 463.86 | 361.36 | 49.50 |
| **CRRFCURB235A00** | 466.70 | 364.20 | 49.50 |
| **CRRFCURB236A00** | 475.86 | 373.36 | 49.50 |
| **CRRFCURB237A00** | 478.95 | 376.45 | 49.50 |
| **CRRFCURB238A00** | 488.11 | 385.61 | 49.50 |
| **CRRFCURB239A00** | 490.95 | 388.45 | 49.50 |
| **CRRFCURB240A00** | 499.86 | 397.36 | 49.50 |
| **CRRFCURB241A00** | 503.20 | 400.70 | 49.50 |
| **CRRFCURB242A00** | 512.11 | 409.61 | 49.50 |
| **CRRFCURB243A00** | 514.95 | 412.45 | 49.50 |
| **CRRFCURB244A00** | 527.20 | 424.70 | 49.50 |
| **CRRFCURB245A00** | 536.36 | 433.86 | 49.50 |
| **CRRFCURB246A00** | 551.45 | 448.95 | 49.50 |
| **CRRFCURB247A00** | 560.36 | 457.86 | 49.50 |
| **CRRFCURB248A00** | 575.45 | 472.95 | 49.50 |

**48N Roof Curb Sizes R, S, T**
**(120-150 Ton Nominal Capacity)**

| PART NUMBER* | DIMENSION A (in.) | DIMENSION B (in.) | DIMENSION C (in.) |
|---|---|---|---|
| **CRRFCURB261A00** | 386.04 | 283.54 | 49.50 |
| **CRRFCURB262A00** | 398.04 | 283.54 | 61.50 |
| **CRRFCURB263A00** | 410.04 | 307.54 | 49.50 |
| **CRRFCURB264A00** | 422.04 | 307.54 | 61.50 |
| **CRRFCURB265A00** | 440.29 | 325.79 | 61.50 |
| **CRRFCURB266A00** | 452.54 | 350.04 | 49.50 |
| **CRRFCURB267A00** | 464.54 | 350.04 | 61.50 |
| **CRRFCURB268A00** | 464.79 | 362.29 | 49.50 |
| **CRRFCURB269A00** | 476.54 | 374.04 | 49.50 |
| **CRRFCURB270A00** | 476.79 | 362.29 | 61.50 |
| **CRRFCURB271A00** | 488.54 | 374.04 | 61.50 |
| **CRRFCURB272A00** | 488.79 | 386.29 | 49.50 |
| **CRRFCURB273A00** | 500.79 | 398.29 | 49.50 |
| **CRRFCURB274A00** | 500.79 | 386.29 | 61.50 |
| **CRRFCURB275A00** | 512.79 | 398.29 | 61.50 |
| **CRRFCURB276A00** | 513.04 | 410.54 | 49.50 |
| **CRRFCURB277A00** | 524.79 | 422.29 | 49.50 |
| **CRRFCURB278A00** | 525.04 | 410.54 | 61.50 |
| **CRRFCURB279A00** | 536.79 | 422.29 | 61.50 |
| **CRRFCURB280A00** | 537.04 | 434.54 | 49.50 |
| **CRRFCURB281A00** | 549.04 | 434.54 | 61.50 |
| **CRRFCURB282A00** | 561.29 | 458.79 | 49.50 |
| **CRRFCURB283A00** | 573.29 | 458.79 | 61.50 |
| **CRRFCURB284A00** | 585.29 | 482.79 | 49.50 |
| **CRRFCURB285A00** | 597.29 | 482.79 | 61.50 |

* Use Applied Rooftop Builder program to select the proper roof curb.

**Fig. 3 — Roof Curb (cont)**


NOTES:
1. ROOF CURB ACCESSORY CRRFCURB286A00 & 287A00 ARE SHIPPED DISASSEMBLED.
2. DIMENSIONS ARE SHOWN IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
3. ROOF CURB: 14 GA.[VA03-56] STL.
ROOF CURB PANS: 16 GA.[VA03-56] STL.
CROSS SUPPORTS : 14 GA.[VA03-56] STL.
VIEW B
(CORNER CONNECTIONS AND SPLICE PLATE CONNECTIONS)
OUTLINE OF UNIT
OVERHANG OF UNIT IS ACCEPTABLE
CONDENSER SECTION
SUPPLY AIR
PLAN VIEW OF ROOF CURB
4.75 GAP
STANDARD ROOF CURB
1/8" X 1" SEAL STRIP
SLOPED ROOF CURB PAN
CROSS SUPPORT 14 GA. STL.
SECTION A-A
(TYPICAL 3 PLACES)
SCALE 1:3
CONDENSER BULKHEAD CROSSRAIL
NOTCH TO CLEAR CONDENSER BULKHEAD CROSSRAIL
SEAL THIS AREA AFTER UNIT IS SET
2.07
ROOF CURB PAN
ROOF CURB CROSS SUPPORT
3.60
2.18
VIEW C-C
1/2" X 2" SEAL STRIP
ATTACH TO ROOF CURB WITH 1/4-20 SELF-DRILLING SCREWS
1/2" X 2" SEAL STRIP TYP BOTH SIDES
1/4" AB X 5/8" LG SCREWS
"E" SEE CHART
STANDARD ROOFCURB
SPLICE PLATE
0'-3" [76]
"D" SEE CHART
10'-8 7/8" [3273] ENTIRE WIDTH
1/8" X 1" SEAL STRIP TYP BOTH SIDES
WOOD BLOCKING SEE VIEW B

**Roof Curb Condenser Support**

| UNIT SIZE NOMINAL TONS | COND COILS 2V | COND COIL 3V | DIM. D | DIM. E | DIM. F | DIM. G |
|---|---|---|---|---|---|---|
| 75 ALL | YES | — | 129.50 | 10.98 | 131.75±0.75 | 133.50 |
| 90 STD EFFICIENCY | YES | — | 129.50 | 10.98 | 131.75±0.75 | 133.50 |
| 90 HIGH EFFICIENCY | — | YES | 181.50 | 10.36 | 183.75±0.75 | 183.25 |
| 105 STD EFFICIENCY | YES | — | 129.50 | 10.98 | 131.75±0.75 | 133.50 |
| 105 HIGH EFFICIENCY | — | YES | 181.50 | 10.36 | 183.75±0.75 | 183.25 |
| 120 STD EFFICIENCY | YES | — | 129.50 | 10.98 | 131.75±0.75 | 133.50 |
| 120 HIGH EFFICIENCY | — | YES | 181.50 | 10.36 | 183.75±0.75 | 183.25 |
| 130 ALL | — | YES | 181.50 | 10.36 | 183.75±0.75 | 183.25 |
| 150 ALL | — | YES | 181.50 | 10.36 | 183.75±0.75 | 183.25 |
| ACCESSORY PART NUMBER | CRRFCURB286A00 | — | 129.50 | 10.98 | — | — |
| | — | CRRFCURB287A00 | 181.50 | 10.36 | — | — |

**Fig. 4 — Roof Curb Condenser Section**

**Step 5 — Install Curb Gasketing —** After ductwork has been connected to the roof curb, apply gasket material ($^1/_2$-in. thick x $1^1/_2$-in. wide neoprene) where indicated.

Single-Thickness Gasketing (See Fig. 5 for Item Numbers) — Apply gasketing in the following places:

1. Along both side rails (1) — 2 places, full length
2. Along return air end rail (2) — 1 place
3. Around return air internal duct flange (3) — 1 or 2 places
4. Around supply air internal duct flanges (4) — 3 places
5. Along supply section base rail (5) — 1 place

Condenser Section Roof Curb (See Fig. 6) — Apply single-thickness gasket along both side rails (5).

## Step 6 — Install Field-Fabricated Ductwork

**⚠ WARNING**

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90-degree elbow in the supply and return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Failure to follow these instructions could result in personal injury or property damage due to falling objects.

Field-fabricated ductwork for vertical supply/vertical return units must be attached to the roof curb, or to the support steel, prior to the final rigging and installation of the unit. Supply and return duct dimensions are shown in Fig. 3.

To attach ductwork to roof curb, insert duct approximately 10 to 11 in. up into roof curb. Connect ductwork to 14-gage roof curb material with sheet metal screws driven from inside the duct.

Secure all ducts to the building structure, using flexible duct connectors between roof curbs and ducts as required. Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. Outlet grilles must not lie directly below unit discharge.

Design supply duct strong enough to handle expected static pressures. Field-fabricated ductwork for horizontal supply/return units must be attached to the unit.

**Step 7 — Rig Unit —** Do not drop unit; keep upright. Use spreader bars over the unit to prevent sling or cable damage. Sheets of plywood placed along the condenser coils will provide additional protection. All lifting lugs MUST be used when lifting unit. Level by using unit frame as a reference. See Fig. 7-9 for information. Unit and accessory weights are shown in Tables 1 and 2. Weight distribution and center of gravity can be found in Fig. 10. Additional unit dimensional data can be found in Fig. 11 and 12.

**Step 8 — Connect Condensate Drain —** The drain is a 2-in. FPT pipe connection located on the right-hand side of the unit looking at the unit from the return air end. See Fig. 11 and 12. Figure 13 shows the additional length of units with an extended chassis.

With field-supplied fittings and pipe sections, plumb the primary condensate drain to the 2-in. FPT connector on the base rail. Use a trap height of at least 7 inches. See Fig. 14 and 15. Apply a bead of RTV or similar sealant around the pipe joint at the connector in the base rail.

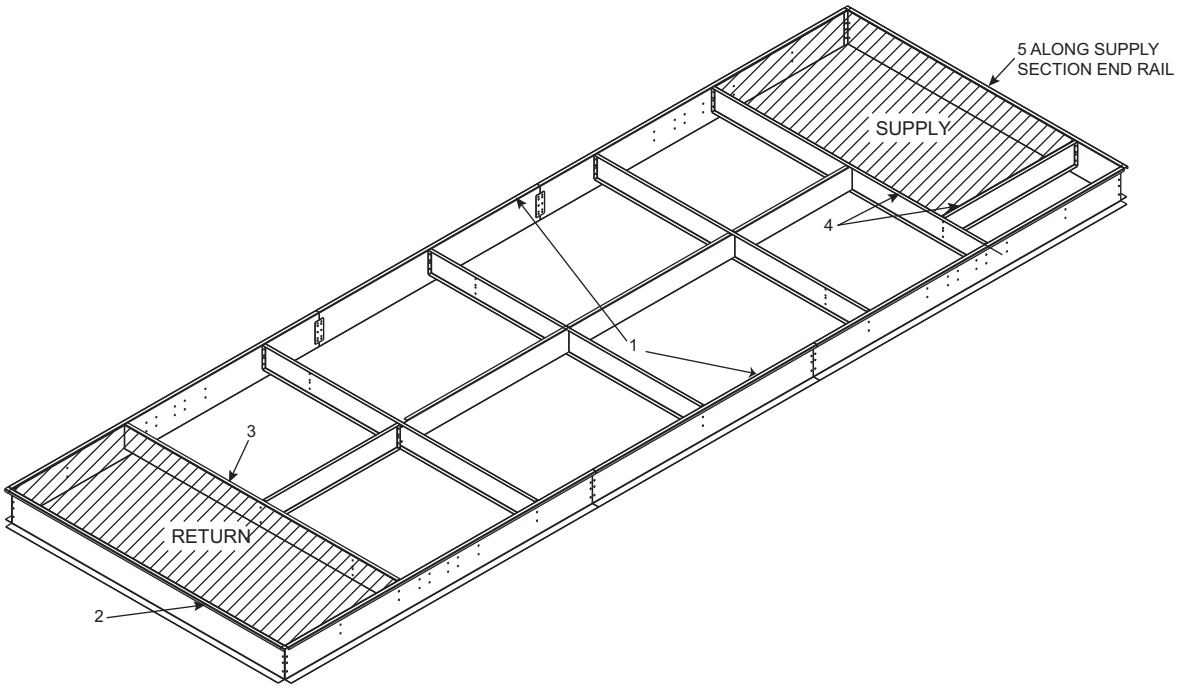



**Fig. 5 — Gasket Location on Roof Curb**

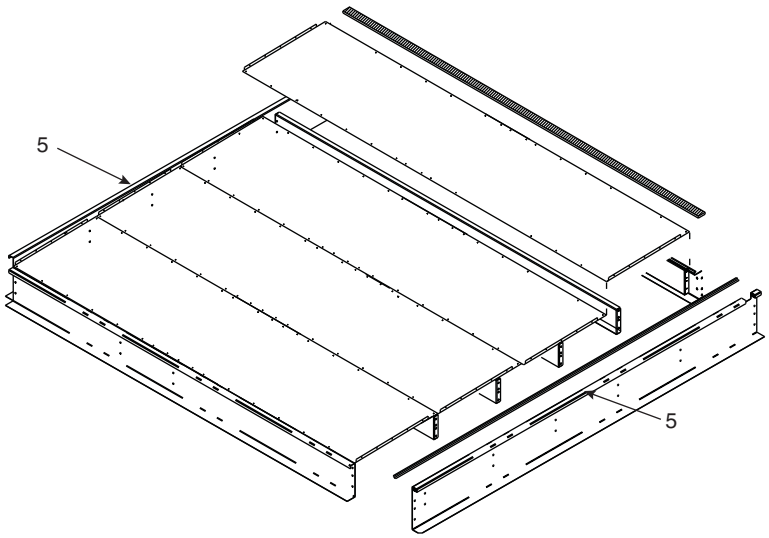



**Fig. 6 — Gasket Location — Condenser Section Roof Curb**

# ⚠ CAUTION - NOTICE TO RIGGERS:

## ALL PANELS MUST BE IN PLACE WHEN RIGGING.

**NOTE: Rig with 8 cables and spread with minimum (2) 148" spreader bars.**

| | NOMINAL CAPACITY (tons) | TOTAL WEIGHT (in.) | CENTER OF GRAVITY | | LIFTING LUG LOCATION | | | | UNIT LENGTH (in.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | A (in.) | B (in.) | L1 (in.) | L2 (in.) | L3 (in.) | L4 (in.) | |
| 48 Series Non-Split | 75 | 17,864 | 275.9 | 67.2 | 51.8 | 201.5 | 278.4 | 458.3 | 508.8 |
| | 90 | 19,319 | 308.1 | 67.2 | 103.8 | 253.5 | 330.4 | 509.3 | 560.8 |
| | 105 | 19,810 | 309.8 | 67.2 | 103.8 | 253.5 | 330.4 | 509.3 | 560.8 |
| | 120 | 23,622 | 309.7 | 67.2 | 103.8 | 253.5 | 330.4 | 519.3 | 570.6 |
| | 130 | 23,970 | 316.7 | 67.2 | 103.8 | 253.5 | 330.4 | 519.3 | 570.6 |
| | 150 | 24,263 | 317.5 | 67.2 | 103.8 | 253.5 | 330.4 | 519.3 | 570.6 |

**NOTE: Weights are for typical featured units with economizer, barometric relief, standard filters, high-capacity evaporator, high efficiency, high supply fan with largest motor, high power exhaust with largest motor, low gas heat, no post section, no extended chassis, no Humidi-MiZer system, no split, no field filter section. Actual unit weight and lug location will vary based on option selection.**

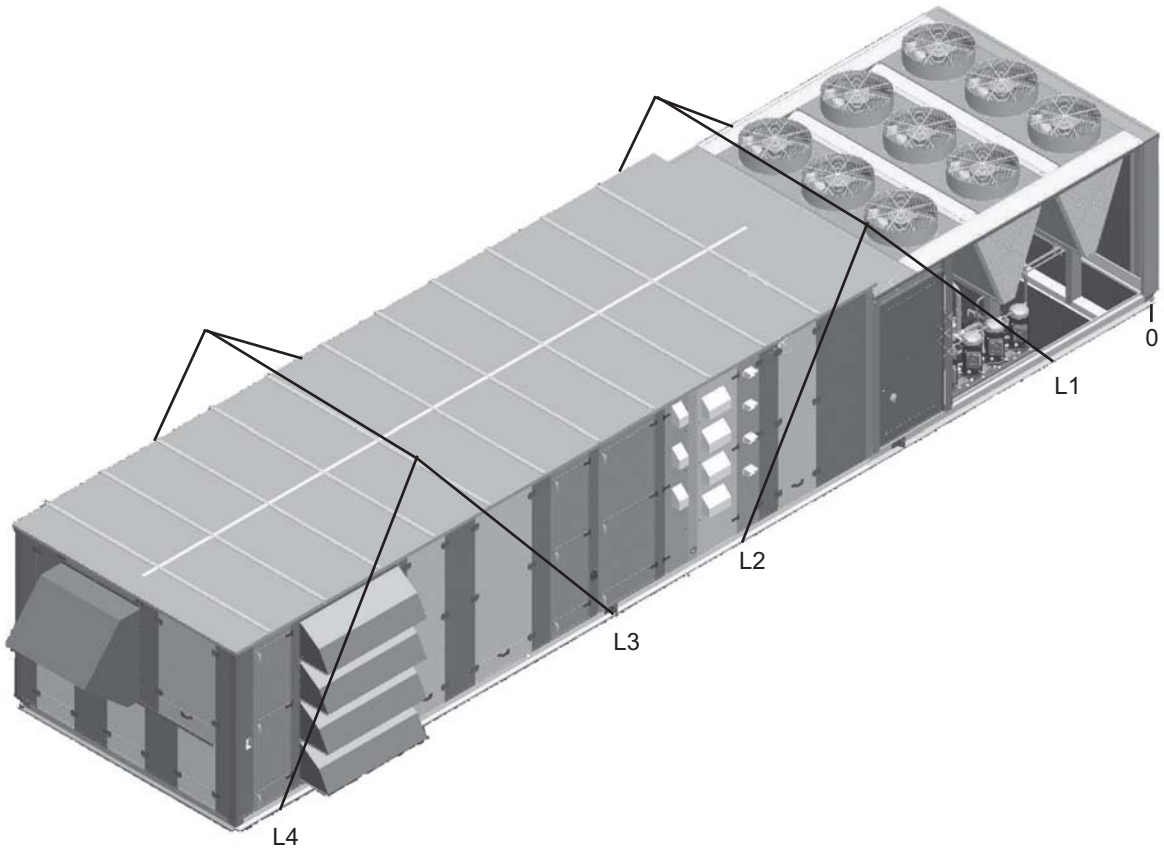



**Fig. 7 — 48N 75-150 Ton Non-Split Rigging**

# ⚠ CAUTION - NOTICE TO RIGGERS:

## ALL PANELS MUST BE IN PLACE WHEN RIGGING.

**NOTE: Rig with 10 cables and spread with minimum 148" spreader bars.**

| | NOMINAL CAPACITY (tons) | TOTAL WEIGHT (lb) | CENTER OF GRAVITY | | LIFTING LUG LOCATION | | | | | UNIT LENGTH (in.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A (in.) | B (in.) | L1 (in.) | L2 (in.) | L3 (in.) | L4 (in.) | L5 (in.) | |
| 48 Series Split - Main Unit | 75 | 15,446 | 285 | 67 | 56 | 149 | 302.2 | 379.2 | 489.6 | 503.1 |
| | 90 | 16,810 | 318 | 67 | 108 | 201 | 354.2 | 431.0 | 541.0 | 555.1 |
| | 105 | 17,301 | 323 | 67 | 108 | 201 | 354.2 | 431.0 | 541.0 | 555.1 |
| | 120 | 20,821 | 326 | 67 | 108 | 201 | 366.2 | 443.2 | 563.5 | 577.0 |
| | 130 | 21,169 | 336 | 67 | 108 | 201 | 366.2 | 443.2 | 563.5 | 577.0 |
| | 150 | 21,349 | 335 | 67 | 108 | 201 | 366.2 | 443.2 | 563.5 | 577.0 |

**NOTE: Weights are for typical featured units with economizer, barometric relief, cartridge filters, high-capacity evaporator, high efficiency, high supply fan with largest motor, high return fan with largest motor, high gas heat, 8 foot blank section with post filters, extended chassis with Humidi-MiZer system, split, no field filter section. Actual unit weight and lug location will vary based on option selection.**

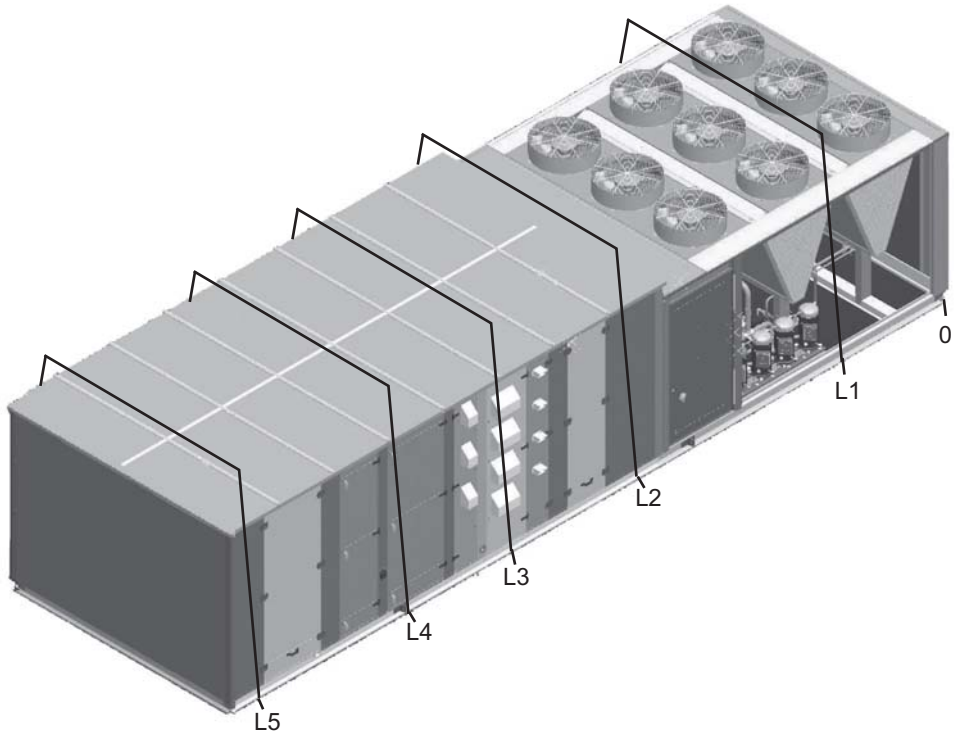



**Fig. 8 — 48N 75-150 Ton Split (Main Unit) Rigging**

# ⚠ CAUTION - NOTICE TO RIGGERS:

## ALL PANELS MUST BE IN PLACE WHEN RIGGING.

**NOTE: Rig with 4 cables and spread with (2) 148" spreader bars.**

| | NOMINAL CAPACITY (tons) | TOTAL WEIGHT (lb) | CENTER OF GRAVITY | | LIFTING LUG LOCATION | | UNIT LENGTH (in.) |
|---|---|---|---|---|---|---|---|
| | | | A (in.) | B (in.) | L1 (in.) | L2 (in.) | |
| 48 Series Split - Return Section | 75 | 5,098 | 76 | 67 | 5.4 | 98.2 | 148.8 |
| | 90 | 5,451 | 78 | 67 | 5.4 | 98.2 | 148.8 |
| | 105 | 5,663 | 78 | 67 | 5.4 | 98.2 | 148.8 |
| | 120 | 6,192 | 78 | 67 | 5.4 | 98.2 | 148.8 |
| | 130 | 6,192 | 78 | 67 | 5.4 | 98.2 | 148.8 |
| | 150 | 6,305 | 78 | 67 | 5.4 | 98.2 | 148.8 |

**NOTE: Weights are for typical featured units with economizer, barometric relief, cartridge filters, high-capacity evaporator, high efficiency, high supply fan with largest motor, high return fan with largest motor, high gas heat, 8 foot blank section with post filters, extended chassis with Humidi-MiZer system, split, no field filter section. Actual unit weight and lug location will vary based on option selection.**

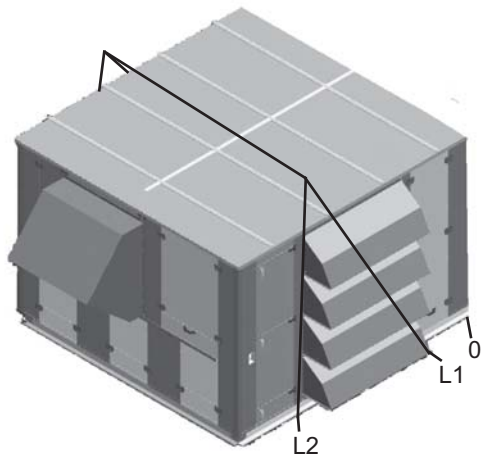
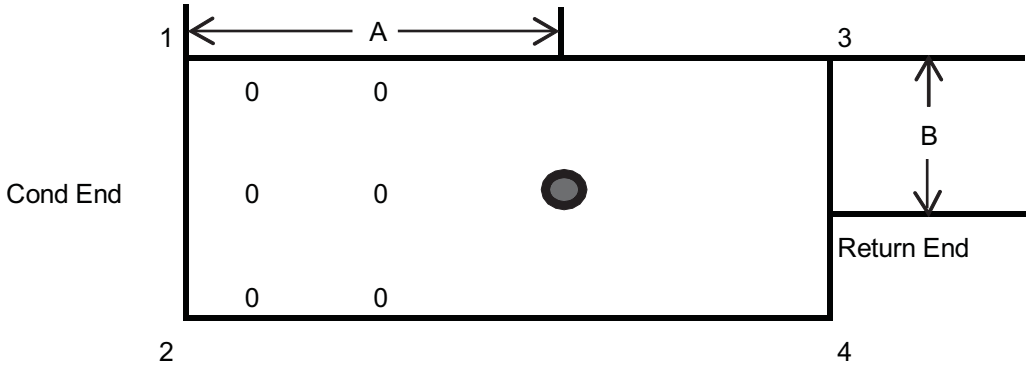



**Fig. 9 — 48N 75-150 Ton Split (Return Section) Rigging**




| | NOMINAL CAPACITY (tons) | CORNER WEIGHTS (lb) | | | | TOTAL (lb) | CENTER OF GRAVITY | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | | A (in.) | B (in.) |
| **48 Series Non-Split** | 75 | 4,129 | 4,047 | 4,892 | 4,796 | 17,864 | 275.9 | 67.2 |
| | 90 | 4,396 | 4,310 | 5,359 | 5,254 | 19,319 | 308.1 | 67.2 |
| | 105 | 4,478 | 4,390 | 5,526 | 5,417 | 19,810 | 309.8 | 67.2 |
| | 120 | 5,455 | 5,347 | 6,474 | 6,346 | 23,622 | 309.7 | 67.2 |
| | 130 | 5,385 | 5,279 | 6,719 | 6,587 | 23,970 | 316.7 | 67.2 |
| | 150 | 5,436 | 5,329 | 6,816 | 6,682 | 24,263 | 317.5 | 67.2 |
| **48 Series Split** | 75 | 4,684 | 4,592 | 5,690 | 5,578 | 20,544 | 355.1 | 67.2 |
| | 90 | 4,969 | 4,871 | 6,273 | 6,149 | 22,261 | 390.3 | 67.2 |
| | 105 | 5,052 | 4,952 | 6,544 | 6,415 | 22,964 | 394.8 | 67.2 |
| | 120 | 6,058 | 5,939 | 7,583 | 7,443 | 27,013 | 401.0 | 67.2 |
| | 130 | 5,972 | 5,854 | 7,845 | 7,691 | 27,361 | 409.6 | 67.2 |
| | 150 | 6,021 | 5,903 | 7,944 | 7,787 | 27,654 | 410.3 | 67.2 |

**Fig. 10 — Weight Distribution and Center of Gravity**

NOTES:
1. DIMENSIONS ARE IN INCHES.
2. ⊕ UNIT WEIGHT AND CENTER OF GRAVITY INCLUDES ECONOMIZER, LARGEST INDOOR FAN MOTOR AND HIGH CAPACITY EVAPORATOR COIL.
3. UNIT CLEARANCES
   TOP - DO NOT RESTRICT CONDENSER FANS
   ECONOMIZER END - 10'-0"
   SIDES AND CONDENSER END 6'- 0"
   FOR SMALLER SERVICE AND OPERATIONAL CLEARANCES, CONTACT CARRIER APPLICATION ENGINEERING DEPARTMENT.
4. SUGGESTED FIELD CONNECTIONS TO MADE INSIDE OR OUTSIDE OF DUCT FLANGES.
5. WHEN UNIT IS SLAB MOUNTED ALLOW ADEQUATE HEIGHT FOR CONDENSATE DRAIN TRAP.
6. ECONOMIZER SIDE HOODS ARE SHIPPED INSIDE OF UNIT.
7. HEAT RECLAIM COIL DIMENSIONS (MAXIMUM)
   - LENGTH (HEADER INCLUDED): 121"
   - WIDTH: 6.00"
   - HEIGHT: 64.50"
8. HEAT RECLAIM COIL FIELD SUPPLIED OR FACTORY INSTALLED.
9. PIPE CHASE LOCATIONS ARE RECOMMENDATIONS ONLY. OPENINGS ARE NOT FACTORY PROVIDED.
10. OPERATIONAL FACTORY SUPPLIED HOT WATER AND STEAM COILS ON UNITS WITHOUT ELECTRIC HEAT.
    HOT WATER COIL DIMENSIONS:
    - LENGTH: 108.75" WIDTH: 6.00" HEIGHT: 64.50"
    - TUBE O. D.: 1/2"- ROWS 2
    - PIPE SIZE 1 1/2" NPT
    STEAM COIL DIMENSIONS:
    - LENGTH : 110.00" WIDTH: 5.00" HEIGHT: 54.00"
    - TUBE O. D.: 1.00"- ROWS 2
    - PIPE SIZE 2 1/2" NPT

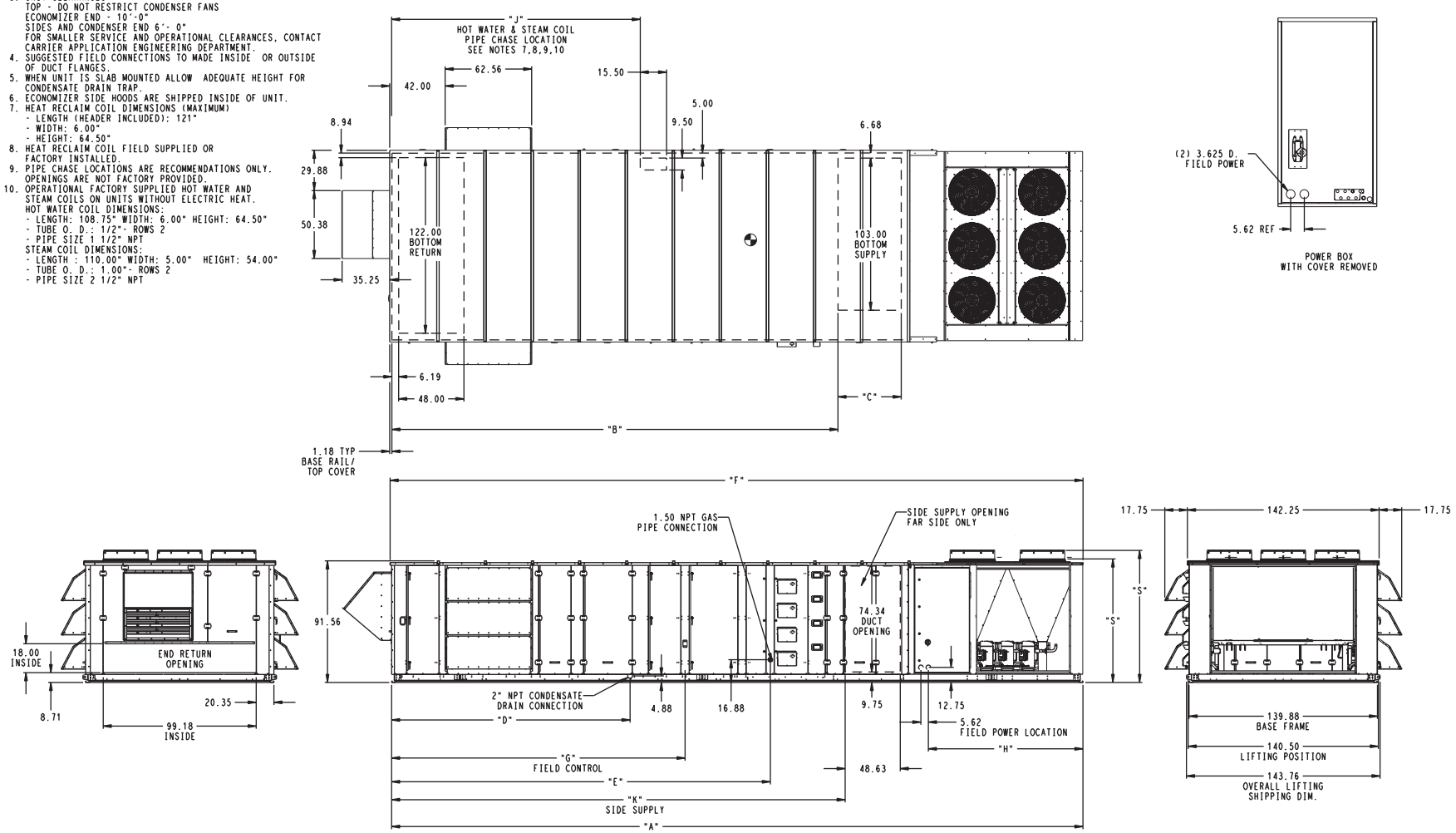



**Fig. 11 — 48N Unit Sizes N, P, Q (75-105 Ton Nominal Capacity)**

| NOMINAL CAPACITY/ EFFICIENCY | EXTENDED CHASSIS | SUPPLY FAN | FIELD USE FILTER SECTION | BLANK SECTION | 2-PIECE UNIT | COND | A | B | C | D | E | F | G | H | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 ALL 90 STD EFF 105 STD EFF | NO | STD | NO | NO | NO | 2 | 498.11 | 314.42 | 48 | 177.02 | 266.07 | 499.35 | 202.75 | 119.76 | — | 313.36 |
| | | | | 4 FT | YES | 2 | 564.61 | 380.92 | 48 | 195.27 | 284.32 | 565.85 | 221.00 | 119.76 | — | 379.86 |
| | | | | 8 FT | YES | 2 | 612.86 | 429.17 | 48 | 195.27 | 284.32 | 614.10 | 221.00 | 119.76 | — | 428.11 |
| | | | YES | NO | YES | 2 | 576.86 | 393.17 | 48 | 255.77 | 344.82 | 578.10 | 281.50 | 119.76 | — | 392.11 |
| | | | | 4 FT | YES | 2 | 625.11 | 441.42 | 48 | 255.77 | 344.82 | 626.35 | 281.50 | 119.76 | — | 440.36 |
| | | | | 8 FT | YES | 2 | 673.36 | 489.67 | 48 | 255.77 | 344.82 | 674.60 | 281.50 | 119.76 | — | 488.61 |
| | | HIGH | NO | NO | NO | 2 | 513.20 | 329.51 | 48 | 177.02 | 281.16 | 514.44 | 217.84 | 119.76 | — | 328.45 |
| | | | | 4 FT | YES | 2 | 579.70 | 396.01 | 48 | 195.27 | 299.41 | 580.94 | 236.09 | 119.76 | — | 394.95 |
| | | | | 8 FT | YES | 2 | 627.95 | 444.26 | 48 | 195.27 | 299.41 | 629.19 | 236.09 | 119.76 | — | 443.20 |
| | | | YES | NO | YES | 2 | 591.95 | 408.26 | 48 | 255.77 | 359.91 | 593.19 | 296.59 | 119.76 | — | 407.20 |
| | | | | 4 FT | YES | 2 | 640.20 | 456.51 | 48 | 255.77 | 359.91 | 641.44 | 296.59 | 119.76 | — | 455.45 |
| | | | | 8 FT | YES | 2 | 688.45 | 504.76 | 48 | 255.77 | 359.91 | 689.69 | 296.59 | 119.76 | — | 503.70 |
| | YES | STD | NO | NO | NO | 2 | 522.11 | 338.42 | 48 | 177.02 | 290.07 | 523.35 | 226.75 | 119.76 | 185.75 | 337.36 |
| | | | | 4 FT | YES | 2 | 588.61 | 404.92 | 48 | 195.27 | 308.32 | 589.85 | 245.00 | 119.76 | 204.00 | 403.86 |
| | | | | 8 FT | YES | 2 | 636.86 | 453.17 | 48 | 195.27 | 308.32 | 638.10 | 245.00 | 119.76 | 204.00 | 452.11 |
| | | | YES | NO | YES | 2 | 600.86 | 417.17 | 48 | 255.77 | 368.82 | 602.10 | 305.50 | 119.76 | 264.50 | 416.11 |
| | | | | 4 FT | YES | 2 | 649.11 | 465.42 | 48 | 255.77 | 368.82 | 650.35 | 305.50 | 119.76 | 264.50 | 464.36 |
| | | | | 8 FT | YES | 2 | 697.36 | 513.67 | 48 | 255.77 | 368.82 | 698.60 | 305.50 | 119.76 | 264.50 | 512.61 |
| | | HIGH | NO | NO | NO | 2 | 537.20 | 353.51 | 48 | 177.02 | 305.16 | 538.44 | 241.84 | 119.76 | 185.75 | 352.45 |
| | | | | 4 FT | YES | 2 | 603.70 | 420.01 | 48 | 195.27 | 323.41 | 604.94 | 260.09 | 119.76 | 204.00 | 418.95 |
| | | | | 8 FT | YES | 2 | 651.95 | 468.26 | 48 | 195.27 | 323.41 | 653.19 | 260.09 | 119.76 | 204.00 | 467.20 |
| | | | YES | NO | YES | 2 | 615.95 | 432.26 | 48 | 255.77 | 383.91 | 617.19 | 320.59 | 119.76 | 264.50 | 431.20 |
| | | | | 4 FT | YES | 2 | 664.20 | 480.51 | 48 | 255.77 | 383.91 | 665.44 | 320.59 | 119.76 | 264.50 | 479.45 |
| | | | | 8 FT | YES | 2 | 712.45 | 528.76 | 48 | 255.77 | 383.91 | 713.69 | 320.59 | 119.76 | 264.50 | 527.70 |
| 90 HI EFF 105 HI EFF | NO | STD | NO | NO | NO | 3 | 550.11 | 314.42 | 48 | 177.02 | 266.07 | 551.35 | 202.75 | 171.76 | — | 313.36 |
| | | | | 4 FT | YES | 3 | 616.61 | 380.92 | 48 | 195.27 | 284.32 | 617.85 | 221.00 | 171.76 | — | 379.86 |
| | | | | 8 FT | YES | 3 | 664.86 | 429.17 | 48 | 195.27 | 284.32 | 666.10 | 221.00 | 171.76 | — | 428.11 |
| | | | YES | NO | YES | 3 | 628.86 | 393.17 | 48 | 255.77 | 344.82 | 630.10 | 281.50 | 171.76 | — | 392.11 |
| | | | | 4 FT | YES | 3 | 677.11 | 441.42 | 48 | 255.77 | 344.82 | 678.35 | 281.50 | 171.76 | — | 440.36 |
| | | | | 8 FT | YES | 3 | 725.36 | 489.67 | 48 | 255.77 | 344.82 | 726.60 | 281.50 | 171.76 | — | 488.61 |
| | | HIGH | NO | NO | NO | 3 | 565.20 | 329.51 | 48 | 177.02 | 281.16 | 566.44 | 217.84 | 171.76 | — | 328.45 |
| | | | | 4 FT | YES | 3 | 631.70 | 396.01 | 48 | 195.27 | 299.41 | 632.94 | 236.09 | 171.76 | — | 394.95 |
| | | | | 8 FT | YES | 3 | 679.95 | 444.26 | 48 | 195.27 | 299.41 | 681.19 | 236.09 | 171.76 | — | 443.20 |
| | | | YES | NO | YES | 3 | 643.95 | 408.26 | 48 | 255.77 | 359.91 | 645.19 | 296.59 | 171.76 | — | 407.20 |
| | | | | 4 FT | YES | 3 | 692.20 | 456.51 | 48 | 255.77 | 359.91 | 693.44 | 296.59 | 171.76 | — | 455.45 |
| | | | | 8 FT | YES | 3 | 740.45 | 504.76 | 48 | 255.77 | 359.91 | 741.69 | 296.59 | 171.76 | — | 503.70 |
| | YES | STD | NO | NO | NO | 3 | 574.11 | 338.42 | 48 | 177.02 | 290.07 | 575.35 | 226.75 | 171.76 | 185.75 | 337.36 |
| | | | | 4 FT | YES | 3 | 640.61 | 404.92 | 48 | 195.27 | 308.32 | 641.85 | 245.00 | 171.76 | 204.00 | 403.86 |
| | | | | 8 FT | YES | 3 | 688.86 | 453.17 | 48 | 195.27 | 308.32 | 690.10 | 245.00 | 171.76 | 204.00 | 452.11 |
| | | | YES | NO | YES | 3 | 652.86 | 417.17 | 48 | 255.77 | 368.82 | 654.10 | 305.50 | 171.76 | 264.50 | 416.11 |
| | | | | 4 FT | YES | 3 | 701.11 | 465.42 | 48 | 255.77 | 368.82 | 702.35 | 305.50 | 171.76 | 264.50 | 464.36 |
| | | | | 8 FT | YES | 3 | 749.36 | 513.67 | 48 | 255.77 | 368.82 | 750.60 | 305.50 | 171.76 | 264.50 | 512.61 |
| | | HIGH | NO | NO | NO | 3 | 589.20 | 353.51 | 48 | 177.02 | 305.16 | 590.44 | 241.84 | 171.76 | 185.75 | 352.45 |
| | | | | 4 FT | YES | 3 | 655.70 | 420.01 | 48 | 195.27 | 323.41 | 656.94 | 260.09 | 171.76 | 204.00 | 418.95 |
| | | | | 8 FT | YES | 3 | 703.95 | 468.26 | 48 | 195.27 | 323.41 | 705.19 | 260.09 | 171.76 | 204.00 | 467.20 |
| | | | YES | NO | YES | 3 | 667.95 | 432.26 | 48 | 255.77 | 383.91 | 669.19 | 320.59 | 171.76 | 264.50 | 431.20 |
| | | | | 4 FT | YES | 3 | 716.20 | 480.51 | 48 | 255.77 | 383.91 | 717.44 | 320.59 | 171.76 | 264.50 | 479.45 |
| | | | | 8 FT | YES | 3 | 764.45 | 528.76 | 48 | 255.77 | 383.91 | 765.69 | 320.59 | 171.76 | 264.50 | 527.70 |

**Condenser Detail**

| UNIT | COND COILS 2V | COND COIL 3V | LOW SOUND | DIMENSION "S" |
|---|---|---|---|---|
| 75 ALL | YES | — | NO | 92.62 |
| 75 ALL | YES | — | YES | 98.06 |
| 90 STANDARD EFFICIENCY | YES | — | NO | 92.62 |
| 90 HIGH EFFICIENCY | — | YES | YES | 98.06 |
| 90 STANDARD EFFICIENCY | YES | — | YES | 98.06 |
| 105 STANDARD EFFICIENCY | YES | — | NO | 98.06 |
| 105 HIGH EFFICIENCY | — | YES | YES | 98.06 |
| 105 STANDARD EFFICIENCY | YES | — | YES | 98.06 |

**Fig. 11 — 48N Unit Sizes N, P, Q (75-105 Ton Nominal Capacity) (cont)**

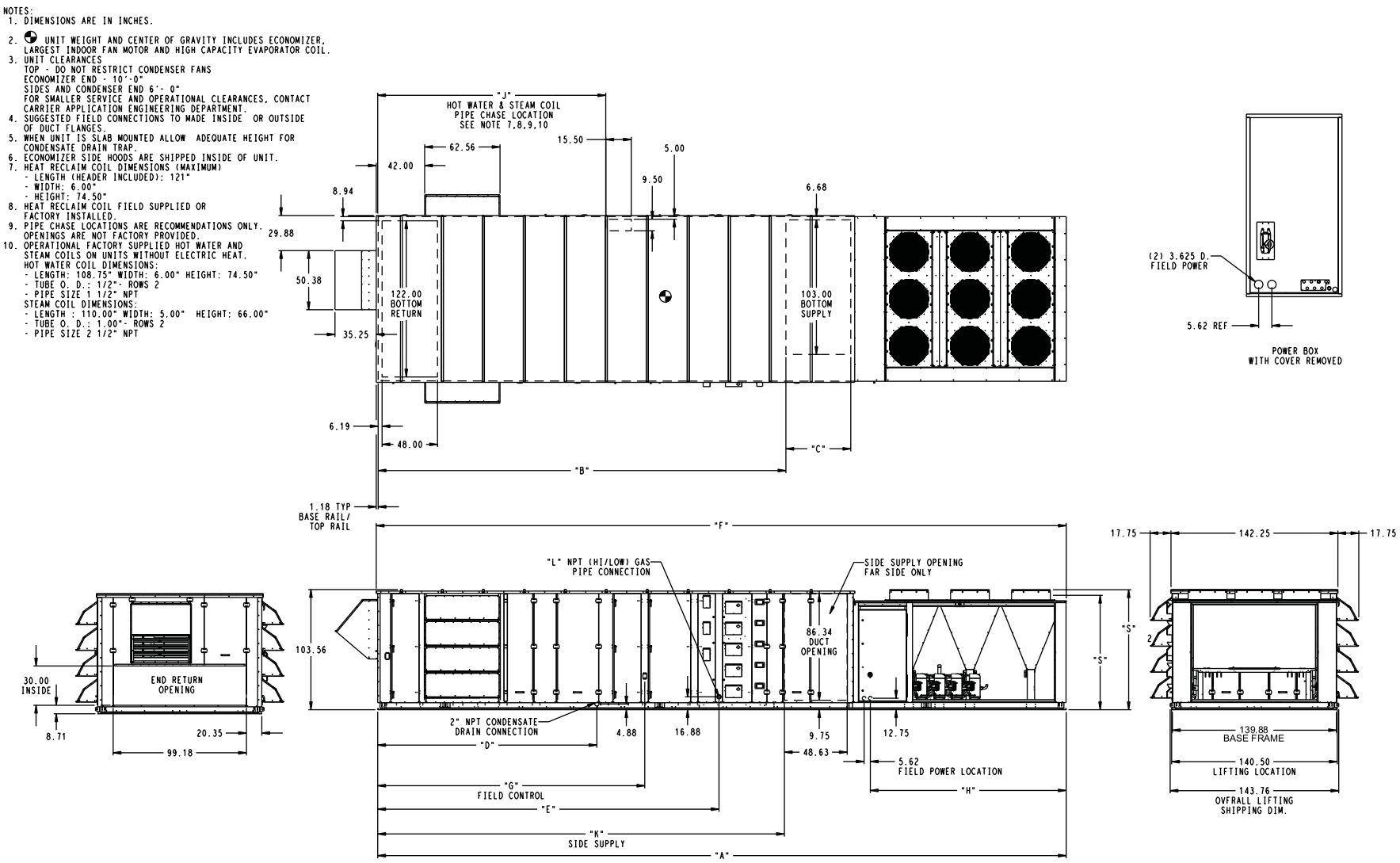



**Fig. 12 — 48N Unit Sizes R, S, T (120-150 Ton Nominal Capacity)**

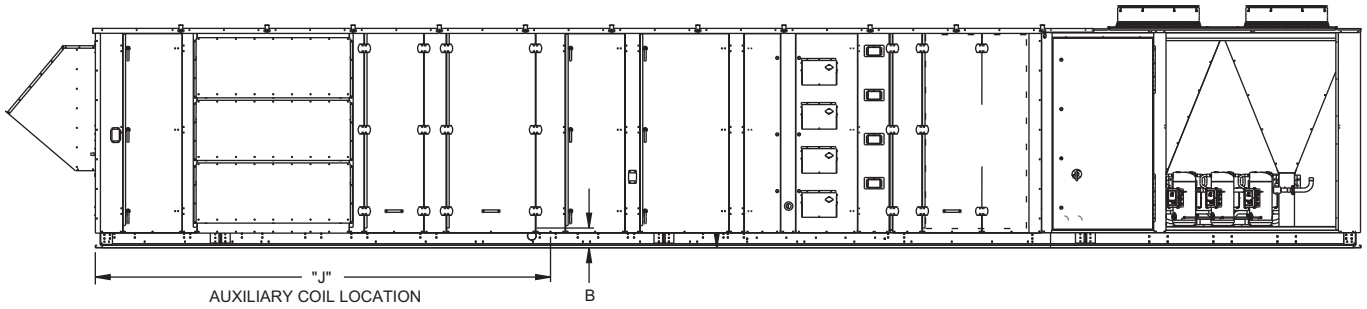
| NOMINAL CAPACITY/ EFFICIENCY | EXTENDED CHASSIS | HIGH GAS HEAT* | FIELD USE FILTER SECTION | BLANK SECTION | 2-PIECE UNIT | COND | A | B | C | D | E | F | G | H | J | K | L HI | L MED LOW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 120 STD EFF | NO | NO | NO | NO | NO | 2 | 523.04 | 339.35 | 48 | 186.86 | 291.00 | 524.28 | 227.68 | 119.76 | — | 338.29 | 2 | 1.5 |
| | | | | 4 FT | YES | 2 | 589.54 | 405.85 | 48 | 205.11 | 309.25 | 590.78 | 245.93 | 119.76 | — | 404.79 | 2 | 1.5 |
| | | | | 8 FT | YES | 2 | 637.79 | 454.10 | 48 | 205.11 | 309.25 | 639.03 | 245.93 | 119.76 | — | 453.04 | 2 | 1.5 |
| | | | YES | NO | YES | 2 | 601.79 | 418.10 | 48 | 265.61 | 369.75 | 603.03 | 306.43 | 119.76 | — | 417.04 | 2 | 1.5 |
| | | | | 4 FT | YES | 2 | 650.04 | 466.35 | 48 | 265.61 | 369.75 | 651.28 | 306.43 | 119.76 | — | 465.29 | 2 | 1.5 |
| | | | | 8 FT | YES | 2 | 698.29 | 514.60 | 48 | 265.61 | 369.75 | 699.53 | 306.43 | 119.76 | — | 513.54 | 2 | 1.5 |
| | | YES | NO | NO | NO | 2 | 535.04 | 339.35 | 60 | 186.86 | 291.00 | 536.28 | 227.68 | 119.76 | — | — | 2 | — |
| | | | | 4 FT | YES | 2 | 601.54 | 405.85 | 60 | 205.11 | 309.25 | 602.78 | 245.93 | 119.76 | — | — | 2 | — |
| | | | | 8 FT | YES | 2 | 649.79 | 454.10 | 60 | 205.11 | 309.25 | 651.03 | 245.93 | 119.76 | — | — | 2 | — |
| | | | YES | NO | YES | 2 | 613.79 | 418.10 | 60 | 265.61 | 369.75 | 615.03 | 306.43 | 119.76 | — | — | 2 | — |
| | | | | 4 FT | YES | 2 | 662.04 | 466.35 | 60 | 265.61 | 369.75 | 663.28 | 306.43 | 119.76 | — | — | 2 | — |
| | | | | 8 FT | YES | 2 | 710.29 | 514.60 | 60 | 265.61 | 369.75 | 711.53 | 306.43 | 119.76 | — | — | 2 | — |
| | YES | NO | NO | NO | NO | 2 | 547.04 | 363.35 | 48 | 186.86 | 315.00 | 548.28 | 251.68 | 119.76 | 195.56 | 362.29 | 2 | 1.5 |
| | | | | 4 FT | YES | 2 | 613.54 | 429.85 | 48 | 205.11 | 333.25 | 614.78 | 269.93 | 119.76 | 213.81 | 428.79 | 2 | 1.5 |
| | | | | 8 FT | YES | 2 | 661.79 | 478.10 | 48 | 205.11 | 333.25 | 663.03 | 269.93 | 119.76 | 213.81 | 477.04 | 2 | 1.5 |
| | | | YES | NO | YES | 2 | 625.79 | 442.10 | 48 | 265.61 | 393.75 | 627.03 | 330.43 | 119.76 | 274.31 | 441.04 | 2 | 1.5 |
| | | | | 4 FT | YES | 2 | 674.04 | 490.35 | 48 | 265.61 | 393.75 | 675.28 | 330.43 | 119.76 | 274.31 | 489.29 | 2 | 1.5 |
| | | | | 8 FT | YES | 2 | 722.29 | 538.60 | 48 | 265.61 | 393.75 | 723.53 | 330.43 | 119.76 | 274.31 | 537.54 | 2 | 1.5 |
| | | YES | NO | NO | NO | 2 | 559.04 | 363.35 | 60 | 186.86 | 315.00 | 560.28 | 251.68 | 119.76 | 195.56 | — | 2 | — |
| | | | | 4 FT | YES | 2 | 625.54 | 429.85 | 60 | 205.11 | 333.25 | 626.78 | 269.93 | 119.76 | 213.81 | — | 2 | — |
| | | | | 8 FT | YES | 2 | 673.79 | 478.10 | 60 | 205.11 | 333.25 | 675.03 | 269.93 | 119.76 | 213.81 | — | 2 | — |
| | | | YES | NO | YES | 2 | 637.79 | 442.10 | 60 | 265.61 | 393.75 | 639.03 | 330.43 | 119.76 | 274.31 | — | 2 | — |
| | | | | 4 FT | YES | 2 | 686.04 | 490.35 | 60 | 265.61 | 393.75 | 687.28 | 330.43 | 119.76 | 274.31 | — | 2 | — |
| | | | | 8 FT | YES | 2 | 734.29 | 538.60 | 60 | 265.61 | 393.75 | 735.53 | 330.43 | 119.76 | 274.31 | — | 2 | — |
| 120 HI EFF 130 ALL 150 STD EFF | NO | NO | NO | NO | NO | 3 | 575.04 | 339.35 | 48 | 186.86 | 291.00 | 576.28 | 227.68 | 171.76 | — | 338.29 | 2 | 1.5 |
| | | | | 4 FT | YES | 3 | 641.54 | 405.85 | 48 | 205.11 | 309.25 | 642.78 | 245.93 | 171.76 | — | 404.79 | 2 | 1.5 |
| | | | | 8 FT | YES | 3 | 689.79 | 454.10 | 48 | 205.11 | 309.25 | 691.03 | 245.93 | 171.76 | — | 453.04 | 2 | 1.5 |
| | | | YES | NO | YES | 3 | 653.79 | 418.10 | 48 | 265.61 | 369.75 | 655.03 | 306.43 | 171.76 | — | 417.04 | 2 | 1.5 |
| | | | | 4 FT | YES | 3 | 702.04 | 466.35 | 48 | 265.61 | 369.75 | 703.28 | 306.43 | 171.76 | — | 465.29 | 2 | 1.5 |
| | | | | 8 FT | YES | 3 | 750.29 | 514.60 | 48 | 265.61 | 369.75 | 751.53 | 306.43 | 171.76 | — | 513.54 | 2 | 1.5 |
| | | YES | NO | NO | NO | 3 | 587.04 | 339.35 | 60 | 186.86 | 291.00 | 588.28 | 227.68 | 171.76 | — | — | 2 | — |
| | | | | 4 FT | YES | 3 | 653.54 | 405.85 | 60 | 205.11 | 309.25 | 654.78 | 245.93 | 171.76 | — | — | 2 | — |
| | | | | 8 FT | YES | 3 | 701.79 | 454.10 | 60 | 205.11 | 309.25 | 703.03 | 245.93 | 171.76 | — | — | 2 | — |
| | | | YES | NO | YES | 3 | 665.79 | 418.10 | 60 | 265.61 | 369.75 | 667.03 | 306.43 | 171.76 | — | — | 2 | — |
| | | | | 4 FT | YES | 3 | 714.04 | 466.35 | 60 | 265.61 | 369.75 | 715.28 | 306.43 | 171.76 | — | — | 2 | — |
| | | | | 8 FT | YES | 3 | 762.29 | 514.60 | 60 | 265.61 | 369.75 | 763.53 | 306.43 | 171.76 | — | — | 2 | — |
| | YES | NO | NO | NO | NO | 3 | 599.04 | 363.35 | 48 | 186.86 | 315.00 | 600.28 | 251.68 | 171.76 | 195.56 | 362.29 | 2 | 1.5 |
| | | | | 4 FT | YES | 3 | 665.54 | 429.85 | 48 | 205.11 | 333.25 | 666.78 | 269.93 | 171.76 | 213.81 | 428.79 | 2 | 1.5 |
| | | | | 8 FT | YES | 3 | 713.79 | 478.10 | 48 | 205.11 | 333.25 | 715.03 | 269.93 | 171.76 | 213.81 | 477.04 | 2 | 1.5 |
| | | | YES | NO | YES | 3 | 677.79 | 442.10 | 48 | 265.61 | 393.75 | 679.03 | 330.43 | 171.76 | 274.31 | 441.04 | 2 | 1.5 |
| | | | | 4 FT | YES | 3 | 726.04 | 490.35 | 48 | 265.61 | 393.75 | 727.28 | 330.43 | 171.76 | 274.31 | 489.29 | 2 | 1.5 |
| | | | | 8 FT | YES | 3 | 774.29 | 538.60 | 48 | 265.61 | 393.75 | 775.53 | 330.43 | 171.76 | 274.31 | 537.54 | 2 | 1.5 |
| | | YES | NO | NO | YES | 3 | 629.29 | 381.60 | 60 | 205.11 | 333.25 | 630.53 | 269.93 | 171.76 | 213.81 | — | 2 | — |
| | | | | 4 FT | YES | 3 | 677.54 | 429.85 | 60 | 205.11 | 333.25 | 678.78 | 269.93 | 171.76 | 213.81 | — | 2 | — |
| | | | | 8 FT | YES | 3 | 725.79 | 478.10 | 60 | 205.11 | 333.25 | 727.03 | 269.93 | 171.76 | 213.81 | — | 2 | — |
| | | | YES | NO | YES | 3 | 689.79 | 442.10 | 60 | 265.61 | 393.75 | 691.03 | 330.43 | 171.76 | 274.31 | — | 2 | — |
| | | | | 4 FT | YES | 3 | 738.04 | 490.35 | 60 | 265.61 | 393.75 | 739.28 | 330.43 | 171.76 | 274.31 | — | 2 | — |
| | | | | 8 FT | YES | 3 | 786.29 | 538.60 | 60 | 265.61 | 393.75 | 787.53 | 330.43 | 171.76 | 274.31 | — | 2 | — |

*Vertical discharge only.

**Condenser Detail**

| UNIT | COND COILS 2V | COND COIL 3V | LOW SOUND | DIMENSION "S" |
|---|---|---|---|---|
| 120 STANDARD EFFICIENCY | YES | — | NO | 96.62 |
| 120 HIGH EFFICIENCY | — | YES | YES | 102.06 |
| 120 STANDARD EFFICIENCY | YES | — | YES | 102.06 |
| 130 STANDARD EFFICIENCY | — | YES | NO | 96.62 |
| 130 HIGH EFFICIENCY | — | YES | YES | 102.06 |
| 150 STANDARD EFFICIENCY | — | YES | YES | 102.06 |

**Fig. 12 — 48N Unit Sizes R, S, T (120-150 Ton Nominal Capacity) (cont)**




**Auxiliary Coil Location — in.**

| UNIT SIZES 48N (TONS) | HEIGHT B | DISTANCE J |
|---|---|---|
| N, P, Q (75-105) | 12.85 | See dimenson J on certified drawings, pages 21-24 |
| R, S, T (120-150) | 12.85 | |

**Fig. 13 — Units with Optional Extended Chassis — Location of Coil Tracks**

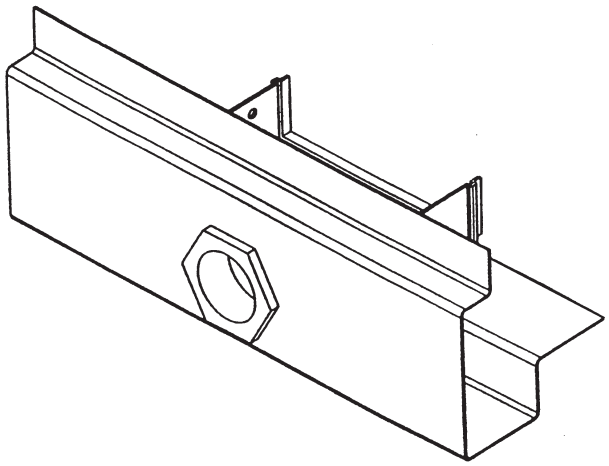


**Fig. 14 — Primary Drain Connection**

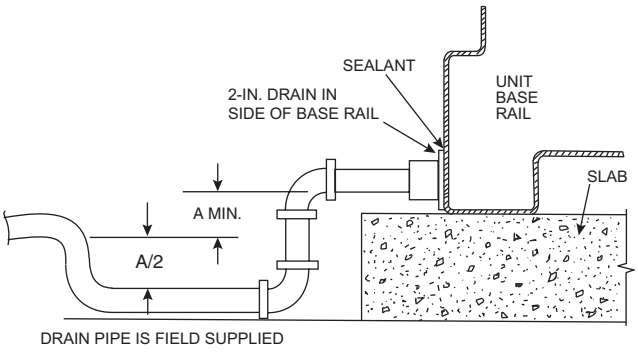



**Fig. 15 — Condensate Drain Piping Details (Slab and Curb Mounted)**

**Step 9 — Install Outdoor Hoods —** Unit sizes 75 to 105 nominal tons will have three hoods on both sides. Unit sizes 120 to 150 nominal tons will have four hoods on both sides. Reference images shown are for three hoods. However, assembly of four hoods for the larger units is the same. Instructions for unpacking and assembly of hoods are below.

1. For shipping, outdoor air hoods are packaged in a box located inside the unit.
2. Remove the box from the unit (see Fig.16).
   a. Shipping support straps are bolted to the unit. Remove four bolts on each, and discard straps.
   b. Remove the hood supports (quantity 2 or 3 for larger units) (see Fig. 17).
   c. Remove packaging from the unit.
   d. Reinstall hood supports (Fig. 17).
3. Remove filters located between return/exhaust fan and economizer dampers; these are packaged separately from hoods for shipping (see Fig. 16). Screws, other hardware and seal strips are packaged with the outdoor hoods (Fig. 16).
4. Apply seal strip to the unit. Strip should extend around entire opening (see Fig. 18).
5. Assemble hoods (see Fig. 19).
   a. Attach hood sides (Items 1 and 2) to the hood top (Item 3). Fasten hood using six screws on each side.
   b. Attach hood support (Item 4) to hood top (Item 3).
   c. Attach angle (Item 5) to hood sides (two per hood). Fasten angle to the hood side using three screws per side.
   d. Attach hood support (Item 7) to top (Item 3) using six screws.
   e. Attach clips (Item 8) to hood support (Item 7).
   f. Attach angle (Item 10) to hood support (Item 7) using eight screws.
   g. Attach angle (Item 9) to angle (Item 10) using two pop rivets.
   h. Place RTV or similar sealant on all of the 6 corners to prevent water leaks.
   i. Install hood assembly to unit using four screws on each side and nine screws on the top.
   j. Install filters (Item 6) to hood assembly.
6. Repeat Step 5 for each hood.

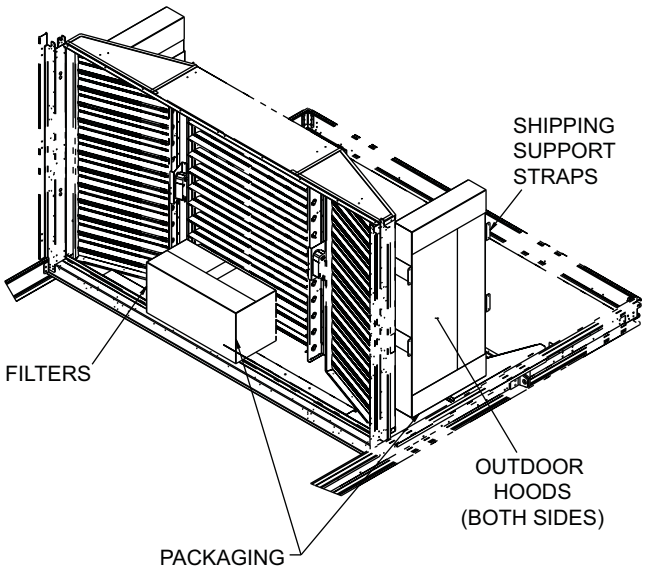



**Fig. 16 — Packaging Locations**

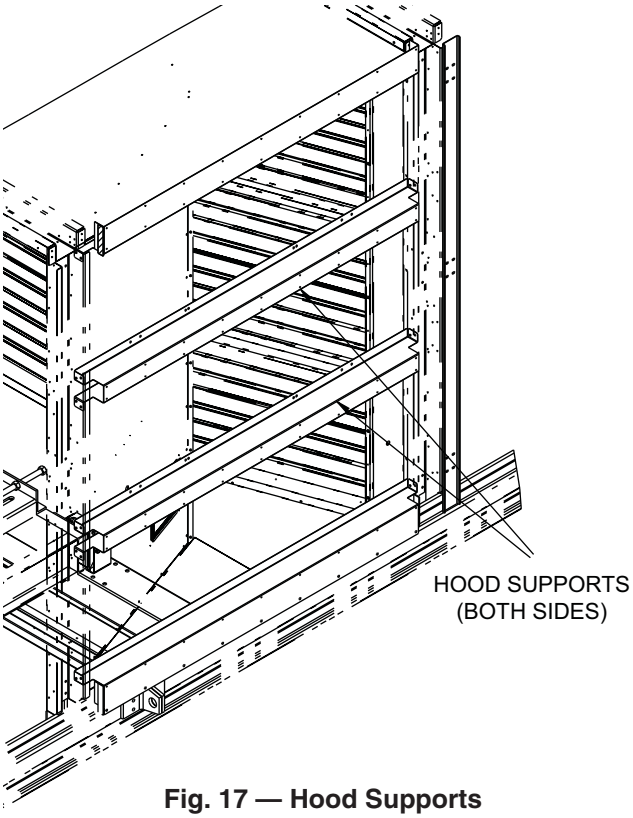



**Fig. 17 — Hood Supports**

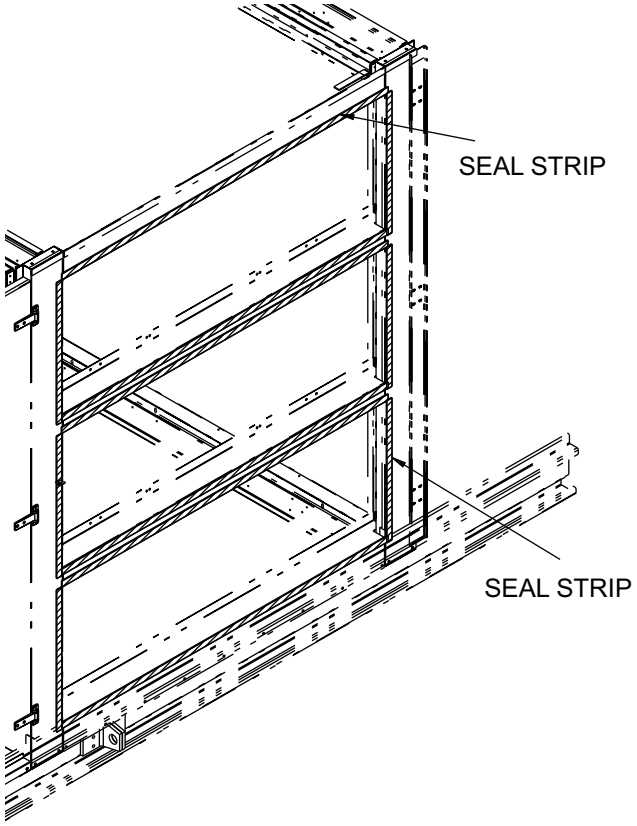



**Fig. 18 — Seal Strips**

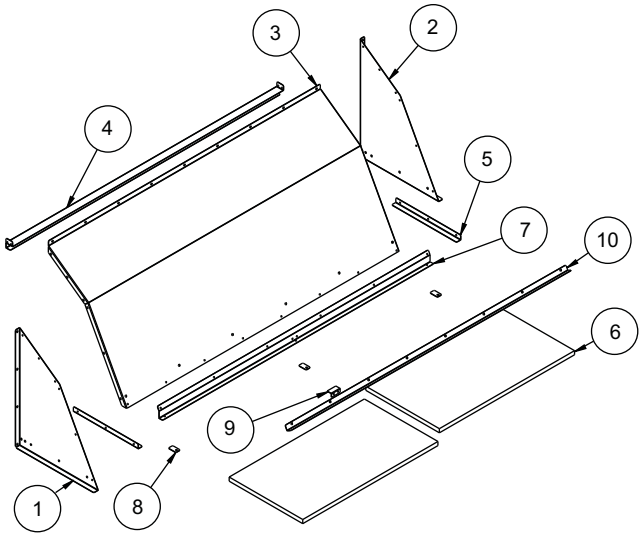
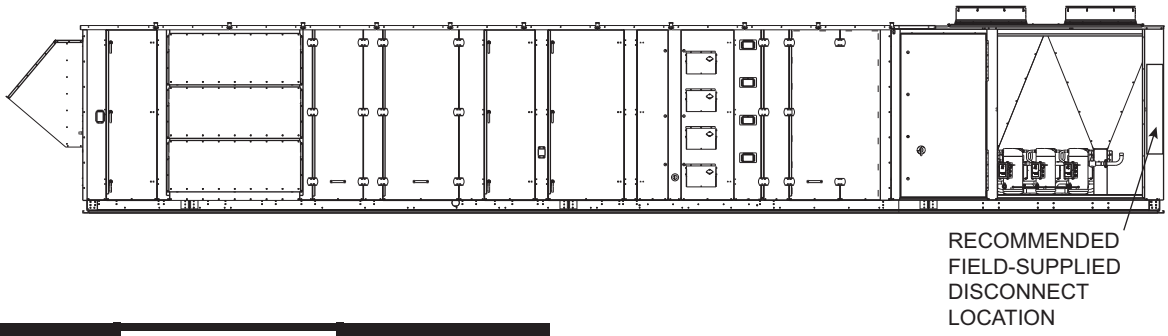



**Fig. 19 — Hood Assembly**

**Step 10 — Route Field Wiring —** Field power wiring is brought into the unit through the back of the power box near the bottom. Wiring can be brought through the roof curb through field-supplied watertight connections. See Fig. 20.

There are two $3^{5}/_{8}$-in. holes for field power wiring in the power box and a $^{7}/_{8}$-in. hole in the side post for 24-v control wiring provided. Field-supplied couplings must be used when routing wiring into the control box.

See Fig. 20 for recommended disconnect location.




**⚠ CAUTION**

Use care when drilling into corner post to avoid damage to condenser coil.

**Fig. 20 — Disconnect Location**

## Step 11 — Make Field Electrical Connections

IMPORTANT: All units have variable frequency drives (VFD) factory installed. VFDs generate, use, and can radiate radio frequency energy. If units are not installed and used in accordance with these instructions, they may cause radio interference. They have been tested and found to comply with limits of a Class A computing device pursuant to International Standard EN 61000-2/3, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

POWER WIRING — Units are factory-wired for the voltage shown on the unit nameplate. The main terminal block is suitable for use with copper wires only. Maximum wire size varies according to disconnect size.

| DISCONNECT SIZE | QUANTITY...MAXIMUM WIRE SIZE (MCM) |
|---|---|
| 250 Amps | 1...300 |
| 400 Amps | 1...600 |
| 600 Amps | 2...600 |

NOTE: Conduit used for field wiring must be sealed at the unit end of the conduit. Failure to do so could cause the conduit to act as a chimney in cold climates causing warm building air to condense in the power box.

Units without Factory-Installed Disconnect — When installing units, provide a disconnect per NEC (National Electrical Code) of adequate size (MOCP [maximum overcurrent protection] of unit is on the informative plate). All field-wiring must comply with NEC and all local codes. Size wire based on MCA (minimum circuit amps) on the unit informative plate. See Fig. 21 for power wiring connections to the unit power terminal block and equipment ground. Maximum wire size is two (2) 500 MCM (maximum wire size) conductors per pole.

Units with Factory-Installed Disconnect — The factory-installed disconnect is an interlocking, door-type. The disconnect handle locks the door when it is in the ON position. The disconnect handle must be in the OFF position to open the control box door. The disconnect is located in the power box behind the power box door for all units. See Fig. 22.

All field wiring must comply with NEC and all local codes. Wire must be sized based on MCA (minimum circuit amps) on the unit informative plate. See Fig. 23 for power wiring connections to the unit disconnect and equipment ground.

Operating Voltage — Operating voltage to the unit must be within the voltage range indicated on the unit nameplate. Voltages between phases must be balanced within 2%, and the current must be balanced within 10%. See Table 7 for motor limits.

Use the following formula to determine the percentage of voltage imbalance.

Voltage Imbalance

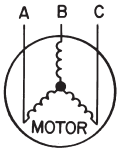
$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.

AB = 452 v

BC = 464 v

AC = 455 v




$$\text{Average Voltage} = \frac{455 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage:

(AB) 457 – 452 = 5 v

(BC) 464 – 457 = 7 v

(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact local utility immediately.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

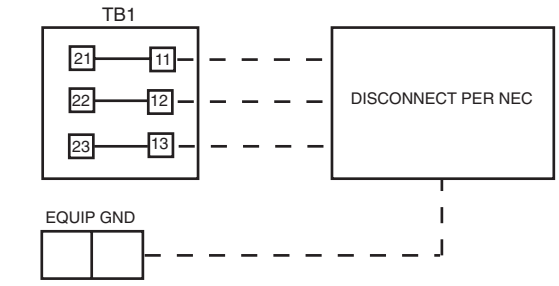



**Fig. 21 — Field Power Wiring Connections**

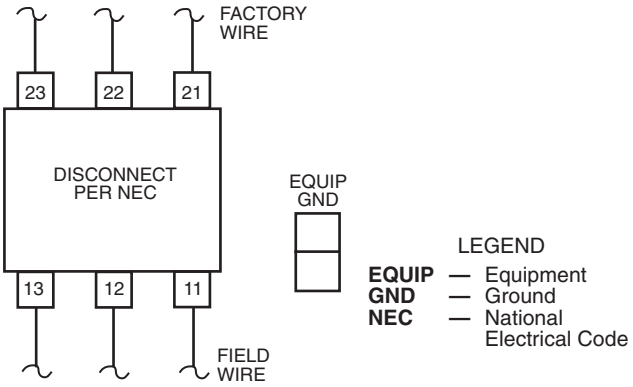



**Fig. 23 — Field Power Wiring Connections for Factory-Installed Disconnect**

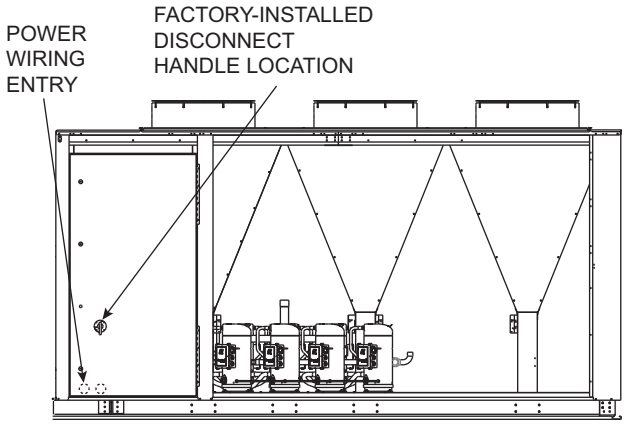



**Fig. 22 — Factory-Installed Disconnect Location (End of Unit Shown)**

**Table 7 — Motor Limits**

| NOMINAL HP | BkW | MAX BHP | MAX BkW | MAX AMPS (EA) | | RATED EFFICIENCY |
|---|---|---|---|---|---|---|
| | | | | 460 V | 575 V | |
| **7.5** | 5.60 | 8.6 | 6.39 | 12.0 | 10.0 | 91.7 |
| **10** | 7.46 | 11.5 | 8.56 | 14.3 | 12.0 | 91.7 |
| **15** | 11.19 | 17.3 | 12.89 | 22.0 | 19.0 | 93.0 |
| **20** | 14.92 | 22.9 | 17.10 | 28.7 | 23.0 | 93.6 |
| **25** | 18.65 | 28.7 | 21.41 | 36.3 | 28.4 | 93.6 |
| **30** | 22.38 | 34.5 | 25.71 | 41.7 | 36.3 | 94.1 |
| **40** | 29.84 | 45.9 | 34.27 | 55.0 | 43.8 | 94.1 |
| **50** | 37.3 | 57.4 | 42.83 | 71.0 | 52.8 | 94.5 |
| **60** | 44.8 | 68.9 | 51.41 | 83.0 | 60.5 | 95.0 |
| **75** | 59.5 | 86.1 | 64.25 | 101.0 | 80.5 | 95.0 |
| **100** | 74.6 | 114.8 | 85.67 | 132.0 | 106.0 | 95.4 |

LEGEND

**Bhp** — Brake Horsepower
**BkW** — Brake Kilowatts

NOTE: Extensive motor and electrical testing on the Carrier units has ensured that the full horsepower range of the motor can be utilized with confidence. Using fan motors up to the horsepower ratings shown in the Motor Limitations table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

**Step 12 — Connect Air Pressure Tubing —** Before options such as the variable frequency drive (VFD) and/or modulating power exhaust can operate properly, the pneumatic tubing for pressure sensing must be installed. Use fire-retardant plenum tubing (field-supplied). All control devices use 1/4-in. tubing. Tubing must be run from the appropriate sensing location (in the duct or in the building space) to the control device location in the unit.

VARIABLE FREQUENCY DRIVE — The tubing for the duct pressure (DP) control option should sample supply duct pressure approximately 2/3 of the way out from the unit in the main trunk duct, at a location where a constant duct pressure is desired.

On these units, the duct pressure is sensed by a pressure transducer. The pressure transducer output is directed to the unit control module. On all sizes, the DP transducer is located in the unit control box. See Fig. 24 for control box details. Use a nominal 1/4-in. plastic tubing.

Refer to appropriate base unit Controls, Start-Up, Operation, Service and Troubleshooting book for instructions on adjusting set points for duct pressure controls.

POWER EXHAUST — The tubing for the building pressure (BP) control (achieved via the modulating power exhaust option) should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to design pressures as possible.

These units use a pressure transducer for sensing building pressure. The BP transducer is located in the unit control box. Use a nominal 1/4-in. plastic tubing.

For instructions on adjusting BP control set points, refer to the Controls, Start-Up, Operation, Service, and Troubleshooting book.

RETURN FAN — The tubing for the building pressure (BP) control (achieved via the return fan option) should sample building pressure in the area near the entrance lobby (or other appropriate and sensitive location) so that location is controlled as closely to design pressures as possible.

The units use a pressure transducer for sensing building pressure. The BP transducer is located in the unit control box. Use a nominal 1/4-in. plastic tubing. For instructions on adjusting BP control set points, refer to the Controls, Start-Up, Operation, Service, and Troubleshooting book.

**Step 13 — Remove Supply-Fan Shipping Bracket Screws —** Supply-fan shipping bracket screws must be removed from each corner of the fan sled before starting unit. See Fig. 25.

1. To remove shipping bracket screws, raise fan sled by turning adjusting bolt counterclockwise until spring is compressed slightly.
2. Remove screws holding shipping bracket to spring support.

   NOTE: It is not necessary to remove the shipping bracket, only remove the screws.
3. After removing all shipping bracket screws, level fan sled using the adjusting screws.

**Step 14 — Remove Optional Power Exhaust Shipping Bracket Screws —** Optional power exhaust shipping bracket screws must be removed from each corner of the fan sled before starting unit.

1. To remove shipping bracket screws, raise fan sled by turning adjusting bolt counterclockwise until spring is compressed slightly.
2. Remove screws holding shipping bracket to spring support.

   NOTE: It is not necessary to remove the shipping bracket, only remove the screws.
3. After removing all shipping bracket screws, level fan sled using the adjusting screws.

**Step 15 — Remove Optional Return-Fan Shipping Brackets —** Optional return fan shipping brackets must be removed from each corner of the fan sled before starting unit. See Fig. 26.

To remove shipping brackets, remove 2 screws holding each bracket to the cross rail. There are 4 brackets per unit.

After removing all shipping brackets, level the fan using the adjustment screws.

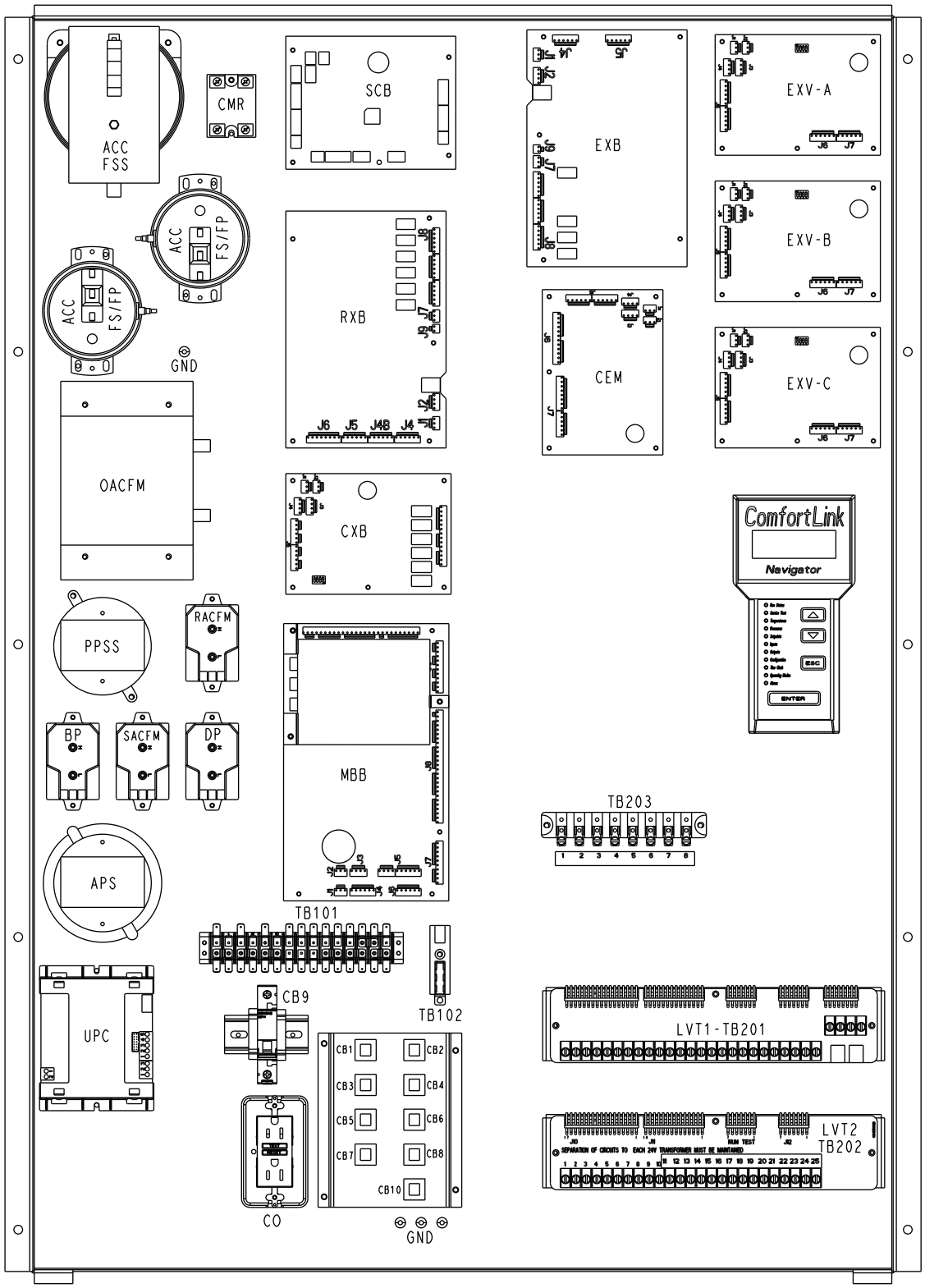



**Fig. 24 — Control Box Component Arrangement**

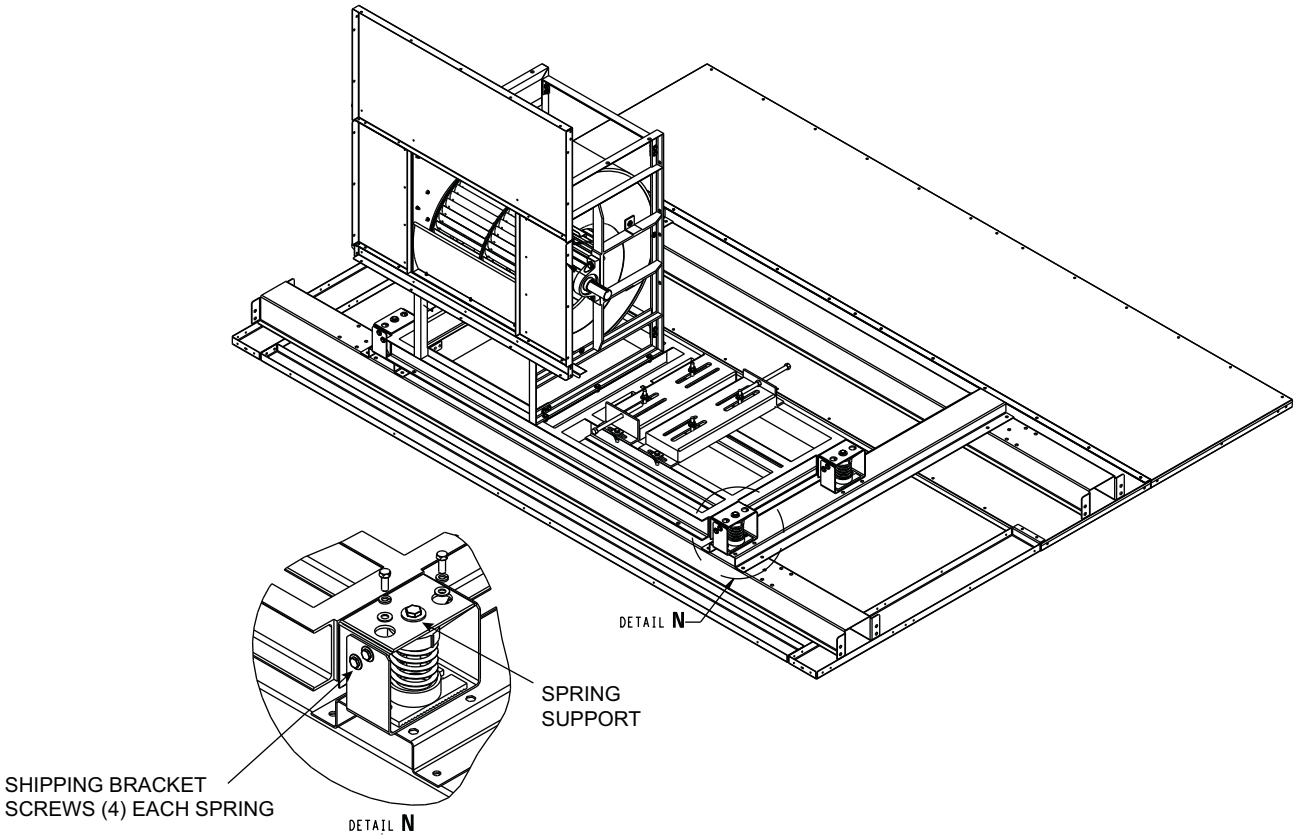



**Fig. 25 — Supply Fan and Power Exhaust Fan Shipping Bracket Bolts**

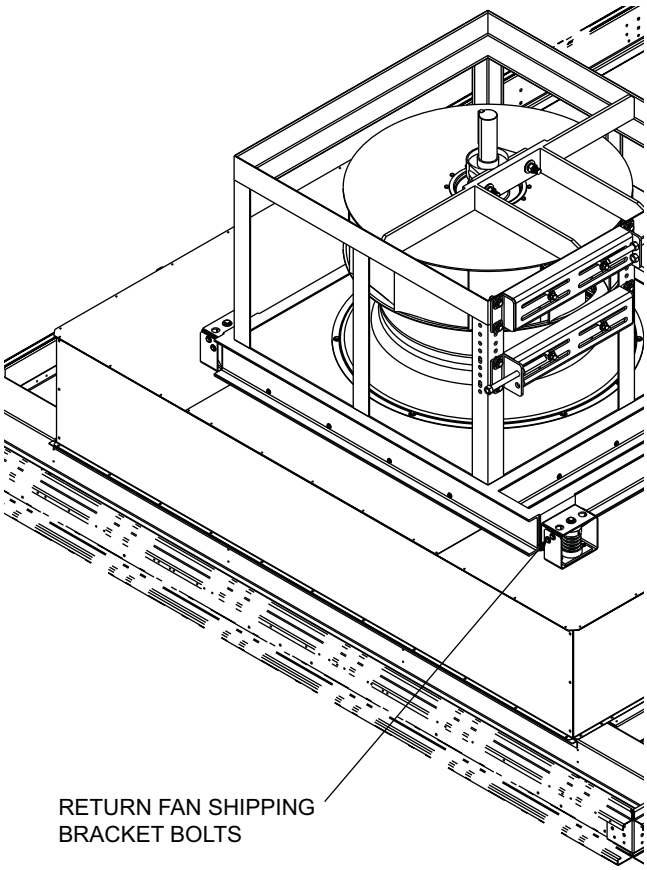



**Fig. 26 — Return Fan Shipping Bracket Bolts**

**Step 16 — Connect Gas Piping —** Unit is equipped for use with natural gas only. Installation must conform with local building codes, or in the absence of local codes, with the National Fuel Gas Code (NFGC), ANSI Z223.1.

A $^{1}/_{8}$-in. NPT tapping plug, accessible for test gage connection, must be field-installed immediately upstream of gas supply connection to unit, but after manual gas valve. See Fig. 27. Natural gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13 in. wg.

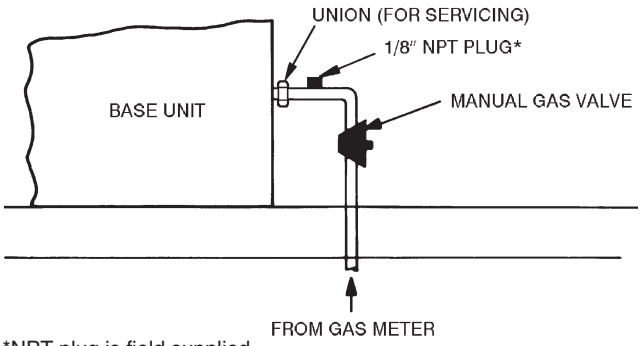
Size gas supply piping for 0.5 in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.

**⚠ CAUTION**

Disconnect gas piping from unit when leak testing at pressures greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in a hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it must be replaced.

**Step 17 — Configure Optional Modulating Gas Control —** The 48N Series large rooftop units may be ordered with an optional factory-installed modulating gas control system that monitors heating operation of the rooftop.

Refer to the Controls, Start-Up, Operation, Service, and Troubleshooting book for information on configuring the modulating gas control.




*NPT plug is field supplied.
NOTE: Follow all local codes.

**Fig. 27 — Gas Piping Details**

**Step 18 — Install Flue/Inlet Hoods —** The flue/inlet hoods are shipped in a package taped to the basepan in the fan section. The flue (outlet) hoods are pre-assembled. The inlet hoods require assembly.

The hoods are to be installed on the heating section access panel as shown in Fig. 28. See Table 8 for a list of parts used to assemble each hood and quantities of each hood type used with each unit.

1. Remove shipping block-offs and shipping tape from all openings in the access panel.
2. Attach flue outlet hoods (see Fig. 28) to access panel using screws provided. Hoods are placed over each combustion outlet.
3. Inlet hoods are shipped unassembled and must be assembled on the access panel (see Fig. 29-31). Flanges of the hood top and sides should be installed on the inside of the access panel openings with the screws provided. The sides should be placed on the inside of the top hoods for all hood assemblies (6-in. and 14-in.). Attach speed clips to screen. Insert screen into bottom opening of 6-in. and 14-in. hoods and secure it with 3 screws. Attached view port cover over 14-in. inlet hood opening (Fig. 31). Secure with two screws.

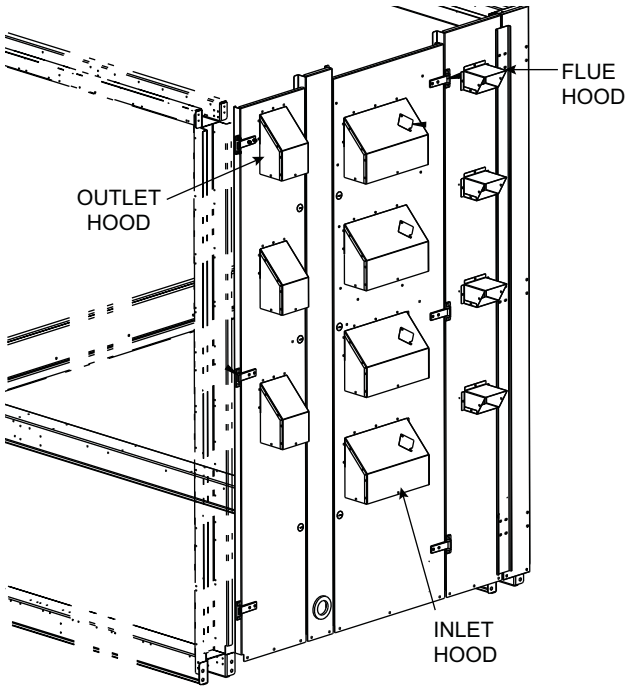



**Fig. 28 — Flue/Inlet Hood Locations**

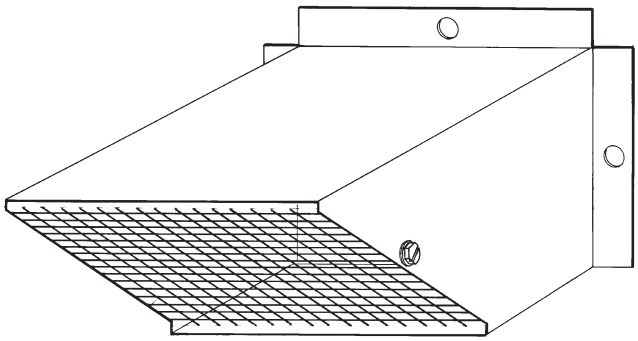


**Fig. 29 — Flue Outlet Hood**

**Table 8 — Flue Hood and Inlet Hood Usage**

| HOOD TYPE | PART LIST | QUANTITY USED | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Sizes 75-105 (Low Heat) | Size 75 (High Heat) | Sizes 90, 105 (Medium Heat) | Sizes 90, 105 (High Heat) | Sizes 120-150 (Low Heat) | Sizes 120-150 (Medium Heat) | Sizes 120-150 (High Heat) |
| **6-in. Inlet Hood** | Top (6-in.) Side (Left) Side (Right) Screen Speed Clips Screws | — | — | — | — | 3 | 3 | 3 |
| **14-in. Inlet Hood** | Top (6-in.) Side (Left) Side (Right) Screen Speed Clips Screws | 2 | 3 | 3 | 4 | 3 | 4 | 4 |
| **Flue Outlet Hood** | Pre-assembled | 2 | 3 | 3 | 4 | 3 | 4 | 5 |

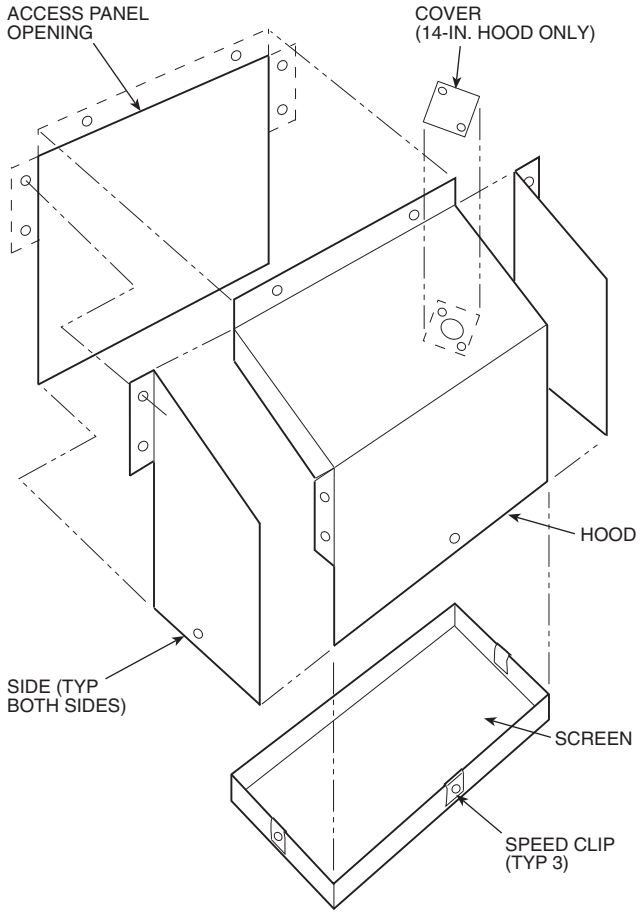



**Fig. 30 — Inlet Hood Assembly (6-in. and 14-in.)**

**Step 19 — Install Supply-Air Thermistors (Modulating Gas Units Only) —** Supply-air thermistors are a field-installed, factory-provided component. Three supply-air thermistors are shipped with modulating gas units inside the unit control box. Thermistor wires must be connected to the SGC (staged gas control) in the unit control box. See Table 9. The supply-air thermistors should be located in the supply duct with the following criteria:

- downstream of the heat exchanger cells
- equally spaced as far as possible from the heat exchanger cells
- a duct location where none of the supply air thermistors are within sight of the heat exchanger cells
- a duct location with good mixed supply air

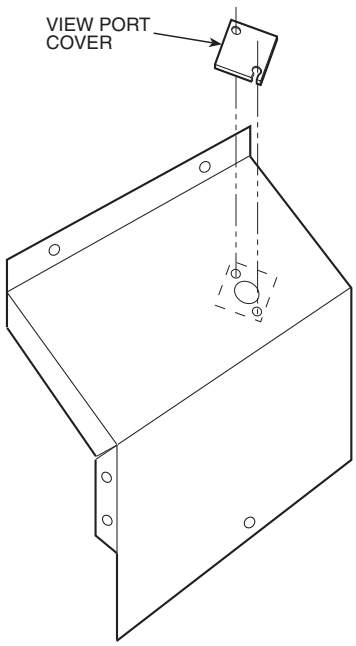



**Fig. 31 — Inlet Hood View Port Cover Installation (14-in.)**

**Step 20 — Install Unit Accessories —** For applications requiring accessories, the following packages are available:

All units:

- space temperature sensor
- $CO_2$ sensor
- space temperature sensor with $CO_2$ sensor
- airflow switch
- filter switch
- smoke detector

Refer to the individual accessory installation instructions in each accessory package for information on installing accessories.

**Table 9 — SGC Thermistor Designations**

| THERMISTOR | PIN CONNECTION POINT | FUNCTION AND LOCATION | PART NO. |
|---|---|---|---|
| | | Thermistors | |
| **SAT1** | J8 – 1,2 (SGC) | Supply-Air Thermistor (SAT) — Inserted into supply section underneath the gas heat section (factory-provided, field-installed) | HH79NZ033 |
| **SAT2** | J8 – 3,4 (SGC) | Supply-Air Thermistor (SAT) — Inserted into supply section underneath the gas heat section (factory-provided, field-installed) | |
| **SAT3** | J8 – 5,6 (SGC) | Supply-Air Thermistor (SAT) — Inserted into supply section underneath the gas heat section (factory-provided, field-installed) | |
| **LIMTTEMP** | J8 – 15,16 (SGC) | Limit switch Thermistor (LIMTTEMP) — Inserted next the lower limit switch (factory-installed) | |

**SGC** — Staged Gas Controller

## Two-Piece Unit Fit Up

1. Locate and remove split parts package from return section of unit. Open package and remove split unit parts. See Tables 10 and 11 for parts list.
2. Rig main unit section and return section separately.
3. Do not assemble main unit section and return section on ground and attempt to lift. Unit pieces must be assembled on roof curb.
4. Insert base rail guides into the base rails of the main unit section. Do not attach with screws yet. See Fig. 32 and 33.
5. Insert top rail guides into top rails of the main unit section. Do not attach with screws yet. See Fig. 32 and 34.
6. Rig and set the main unit section on the unit roof curb. Align the unit bulkhead with the supply opening in the roof curb.
7. Remove the roof cap, top cover and L brackets from the filter end of the return section. Save these parts for later installation. See Fig. 35 and 36.
8. Rig and set return section onto the roof curb using rail guides as an alignment aid. The return section must be within 2 in. of the main unit section. Slide base rail and top rail guides from main unit section rails partially into return section rails.
9. Install tar tape on edge of main unit base rails to seal base rail splice. See Fig. 37.
10. Using ¾-in. x 30-in. threaded rod, nuts, washers and backing plates provided, pull and secure the base rails together. See Fig. 38.
11. Attach (4) brackets to top rails. Using $^{3}/_{8}$-in. x 6-in. threaded rods, nuts, washers and backing plates provided, pull the top rails together and secure with top rail guide from Step 5. See Fig. 39. Remove threaded rods and brackets after securing top rail guide.
12. Place seal strip along both sides of basepan joint. Attach basepan covers to basepan joint. See Fig. 40.
13. Install L brackets, top cover and top cap joining main unit section and return section top cover assemblies. See Fig. 41 and 42.
14. Connect control wiring plugs located at unit split. All same color plugs should be connected together.

    On units equipped with return air fan or power exhaust fan option, locate black, yellow, and blue power wires located at the split in main section. Run the wires through the grommet below the return air filters and through the grommet at the economizer damper. See Fig. 43. Run wires through wire trays, separate from control wires, to the return fan/power exhaust fan VFD on back wall of return section. Connect wires to VFD power terminal connections: Black to UL1, Yellow to V1, and Blue to W1. On units equipped with VFD bypass option connect the wires to the power distribution in the VFD bypass box: Black to L1, Yellow to L2, and Blue to L3. See Fig. 44.

    Connect air pressure tubes located at split. All same numbered tubes should be connected together. See Table 12 for tubes associated with unit options.
15. Install side post on far side of unit. See Fig. 45.
16. Install side panels at main unit section/return section split. Install panel side brackets, 2 on each panel. See Fig. 45.

## Table 10 — 75-105 Nominal Ton Units Parts List

| ITEM | COMPONENT NUMBER | QUANTITY | COMPONENT NAME | COMPONENT QUALIFIER |
|---|---|---|---|---|
| 1 | 48NG501939 | 2 | RAIL,MOUNTING | SPLIT,BASE,GUIDE |
| **2** | 48NG501935 | 2 | ROD,THREADED | 3/4-10 UNC 2A 30-in. L |
| **3** | 48NG501937 | 8 | WASHER,PLATE | 3/4-in. LRT SPLIT |
| **4** | AU02AB361 | 4 | WASHER,FLAT | 3/4 |
| **5** | AT11AB361 | 6 | NUT,HEAVY HEX | 3/4-10 |
| **6** | 48NG501938 | 4 | BRACKET,TIE | LRT SPLIT TOP |
| **7** | AL48AM307 | 12 | SCREW,HEXHD SR | 1/4 X 5/8 |
| **8** | 48NG501936 | 2 | ROD,THREADED | 3/8-16 UNC 2A 6" L |
| **9** | AU02AB242 | 4 | WASHER,FLAT | 3/8 |
| **10** | AT39AB241 | 4 | NUT,HEX | 3/8-16 |
| **11** | 48NG501940 | 1 | PLATE,COVER | SPLIT,BASEPAN |
| **12** | 48NG501941 | 1 | PLATE,COVER | SPLIT,BASEPAN |
| **15** | AL31AY308 | 34 | SCREW | |
| **16** | AL79AU216 | 2 | SCREW,HEXHD TF | #10 X 1/2 |
| **17** | 48NG401017 | 1 | POST ASSY,SIDE | 6-in. (75-105 T) |
| **18** | 48NG401072 | 2 | PANEL ASSY,SIDE | 12-in. (75-105 T) |
| **19** | 48NG501897 | 3 | BRACKET,PANEL | SKIN JOINT 75-105T |
| **21** | AA06BS168 | 40 | BOLT,HEXHD | 1/4 X 0.75 |
| **28** | AL56ZA003 | 42 | SCREW | 1/4 AB-14 X 5/8-in. SERR. |
| **31** | 99SR120216142001 | 2 | SEAL STRIP | |
| **33** | 48NG501629 | 2 | PLATE | JOIN SPLIT UNITS |
| **40** | PF0144 | 3 | SEALER,PRESTITE | 2-in. WIDE ROLL |

## Table 11 — 120-150 Nominal Ton Units Parts List

| ITEM | COMPONENT NUMBER | QUANTITY | COMPONENT NAME | COMPONENT QUALIFIER |
|---|---|---|---|---|
| 1 | 48NG501939 | 2 | RAIL, MOUNTING | SPLIT,BASE,GUIDE |
| **2** | 48NG501935 | 2 | ROD, THREADED | 3/4-10 UNC 2A 30-in. L |
| **3** | 48NG501937 | 8 | WASHER, PLATE | 3/4-in. LRT SPLIT |
| **4** | AU02AB361 | 4 | WASHER, FLAT | 3/4 |
| **5** | AT11AB361 | 6 | NUT, HEAVY HEX | 3/4-10 |
| **6** | 48NG501938 | 4 | BRACKET, TIE | LRT SPLIT TOP |
| **7** | AL48AM307 | 12 | SCREW, HEXHD SR | 1/4 X 5/8 |
| **8** | 48NG501936 | 2 | ROD, THREADED | 3/8-16 UNC 2A 6-in. L |
| **9** | AU02AB242 | 4 | WASHER, FLAT | 3/8 |
| **10** | AT39AB241 | 4 | NUT, HEX | 3/8-16 |
| **11** | 48NG501940 | 1 | PLATE, COVER | SPLIT,BASEPAN |
| **12** | 48NG501941 | 1 | PLATE, COVER | SPLIT,BASEPAN |
| **15** | AL31AY308 | 34 | SCREW | |
| **16** | AL79AU216 | 2 | SCREW, HEXHD TF | #10 X 1/2 |
| **17** | 48NG401018 | 1 | POST ASSY, SIDE | 6-in. (120-150 T) |
| **18** | 48NG401070 | 2 | PANEL ASSY, SIDE | 12-in. (120-150 T) |
| **19** | 48NG501896 | 3 | BRACKET, PANEL | SKIN JOINT 120-150T |
| **20** | 48NG500998 | 2 | HANDLE | |
| **21** | AA06BS168 | 40 | BOLT, HEXHD | 1/4 X 0.75 |
| **38** | AL56ZA003 | 42 | SCREW | 1/4 AB-14 X 5/8-in. SERR. |
| **33** | 48NG501629 | 2 | PLATE | JOIN SPLIT UNITS |
| **40** | PF0144 | 3 | SEALER, PRESTITE | 2-in. WIDE ROLL |

## Table 12 — Air Pressure Tube Connections

| OPTION | CONTROL | TUBE NUMBER |
|---|---|---|
| **Return Air Fan** | RACFM Control PPSS | 4, 5 and 6 |
| **Power Exhaust Fan with CFM Sensor** | EACFM Control | 5 and 6 |
| **Outdoor Air CFM** | OACFM Control | 7 and 8 |

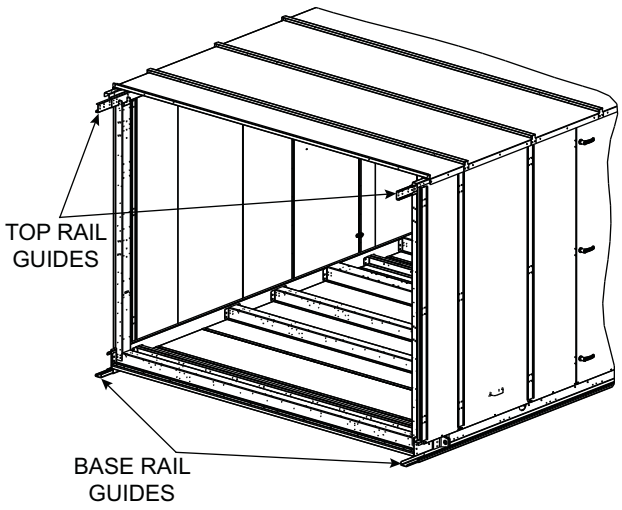



**Fig. 32 — Base and Top Rail Guide Locations**

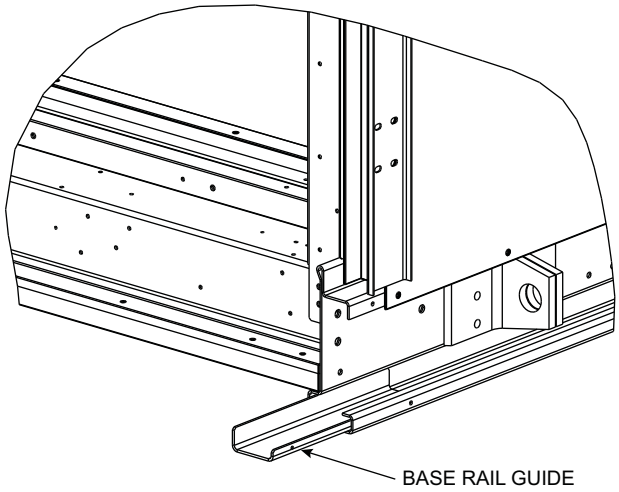



**Fig. 33 — Base Rail Guide**

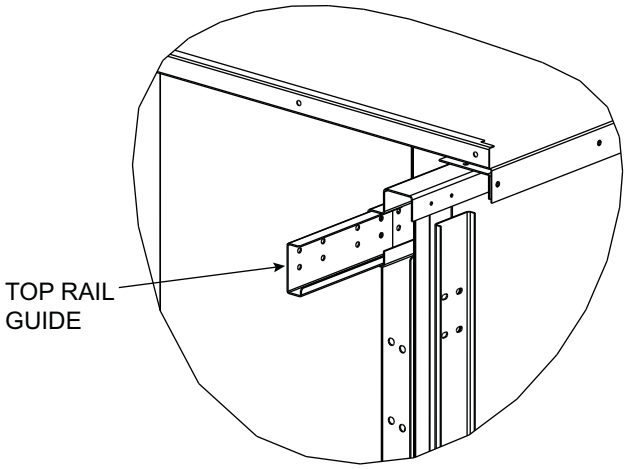



**Fig. 34 — Top Rail Guide**

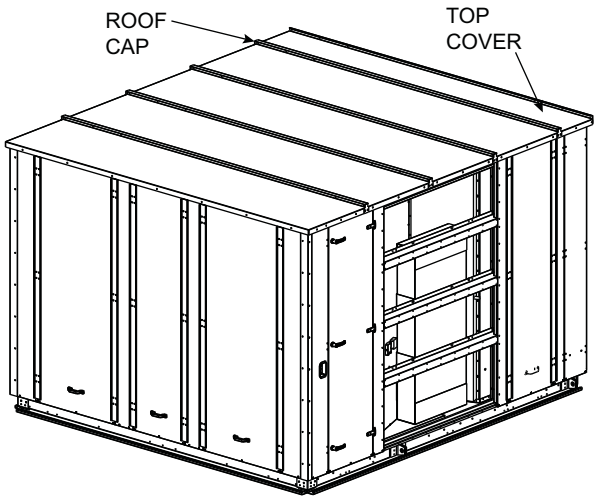



**Fig. 35 — Roof Cap and Top Cover Removal**

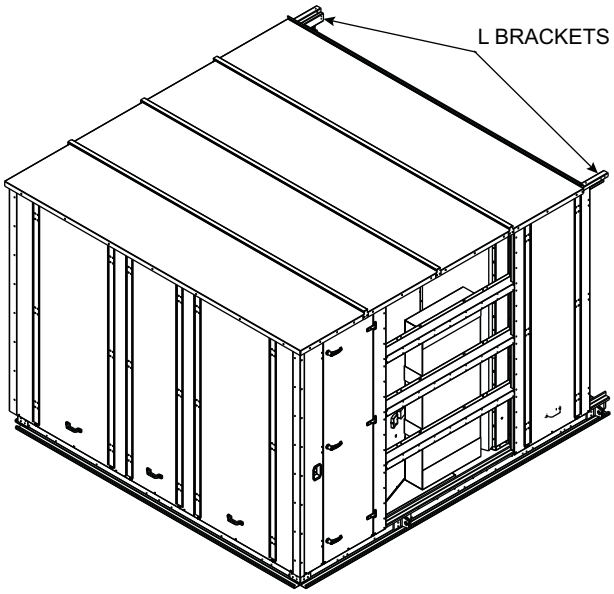



**Fig. 36 — L Bracket Removal**

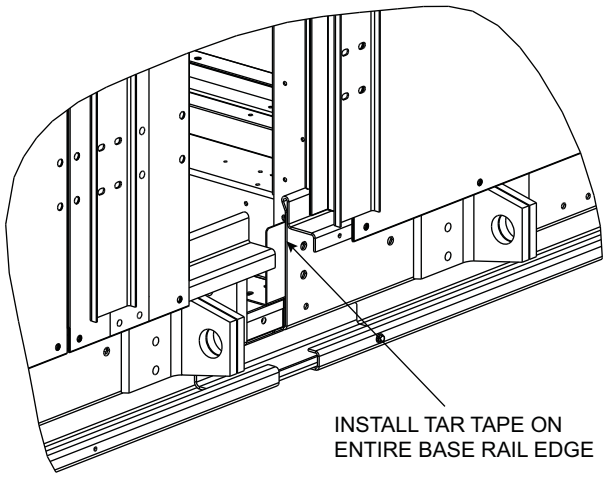



**Fig. 37 — Tar Tape Location**

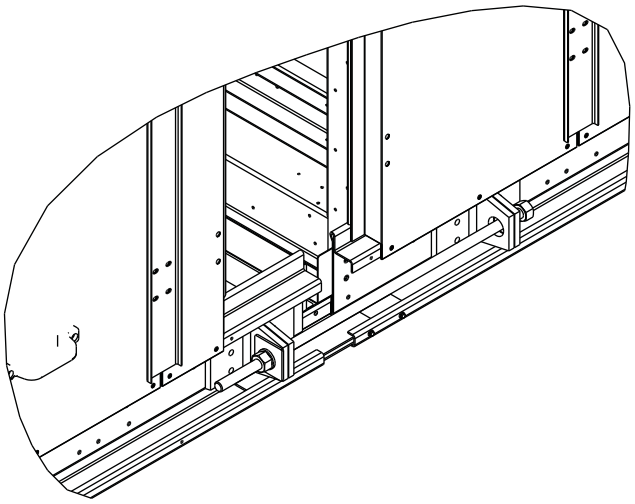


**Fig. 38 — Secure Base Rails**

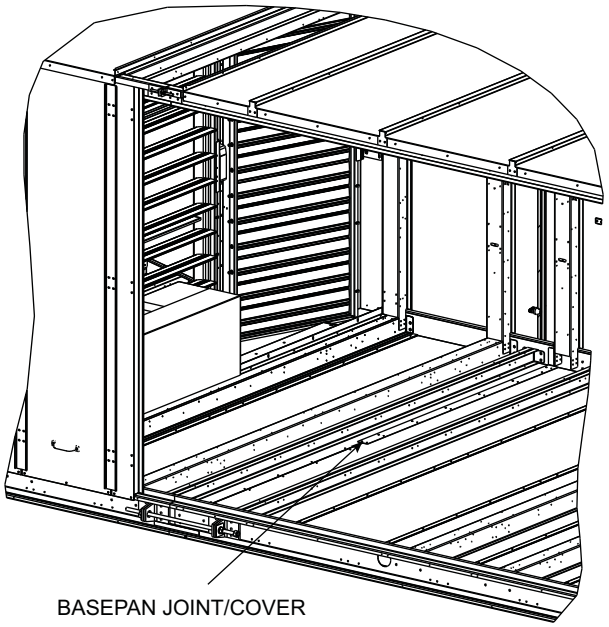



**Fig. 40 — Basepan Joint/Cover**

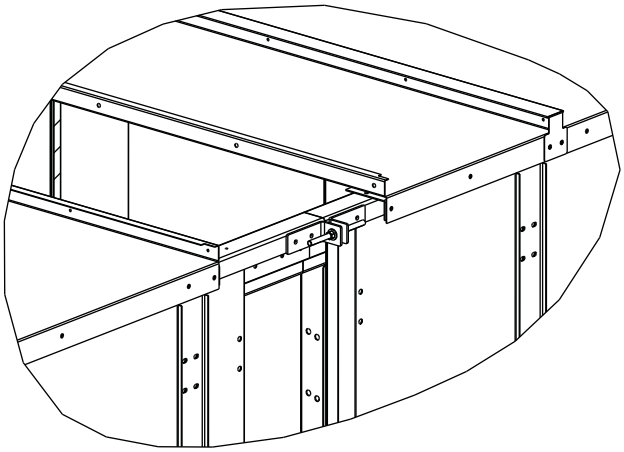


**Fig. 39 — Top Rail Brackets**

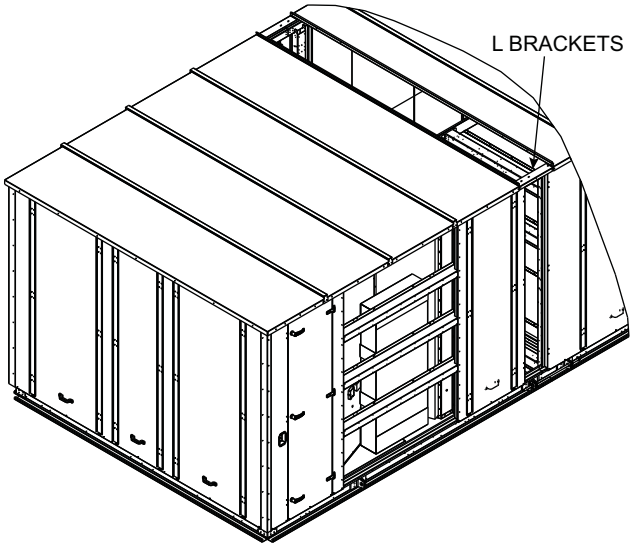



**Fig. 41 — L Bracket Installation**

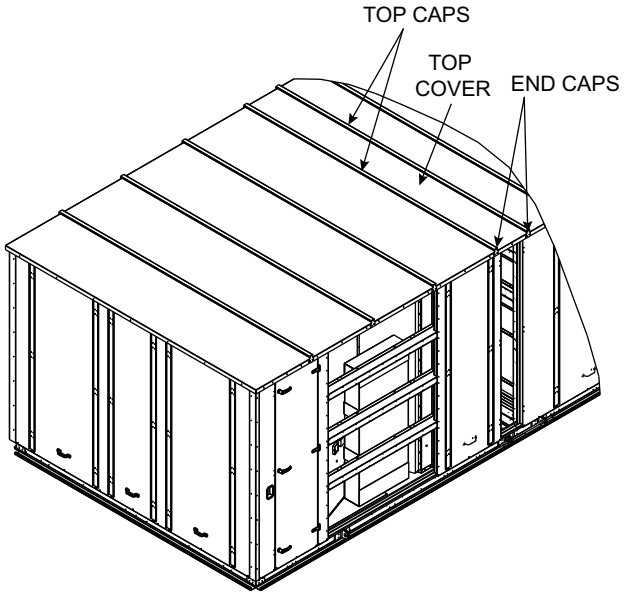



**Fig. 42 — Main Unit and Return Section Top Cover Assemblies**

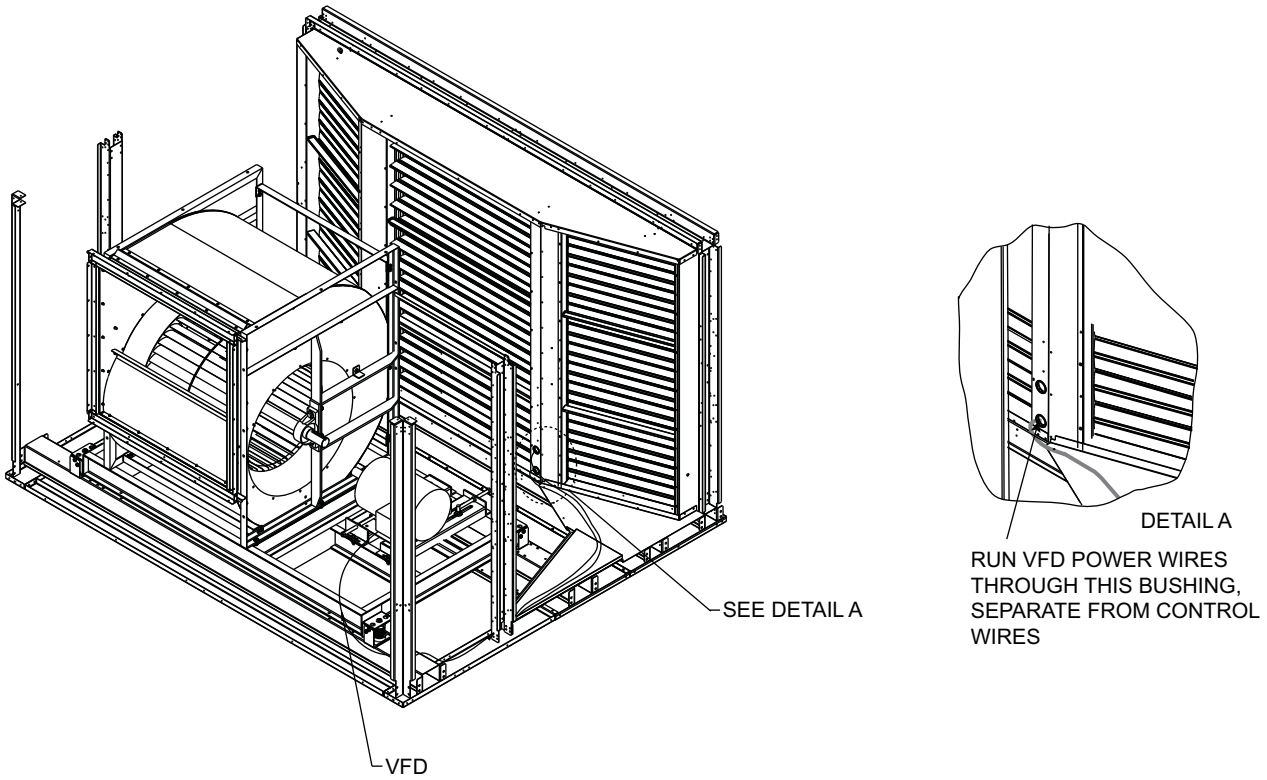



**Fig. 43 — Wire Routing**

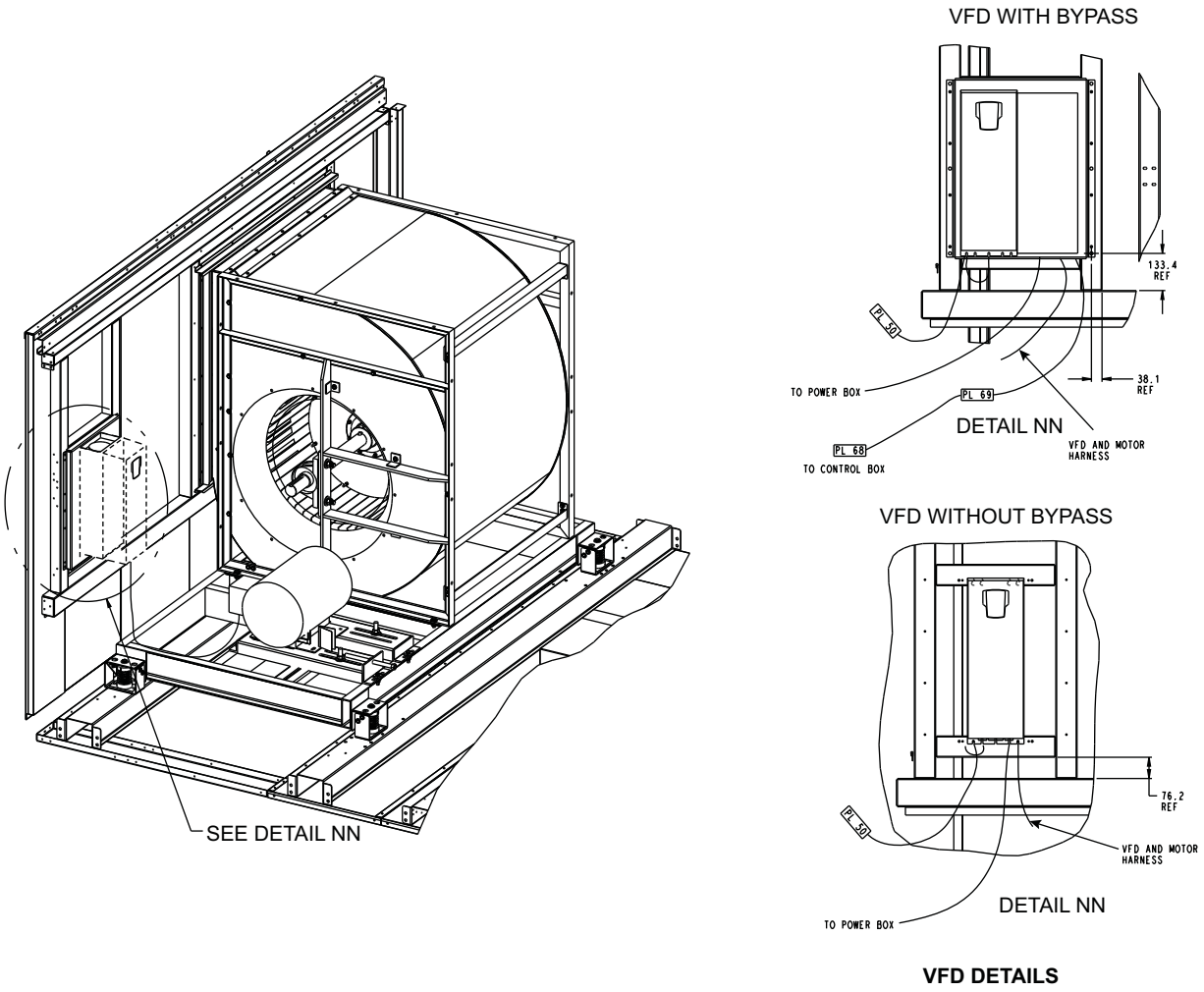



**Fig. 44 — Return Section Component Locations**

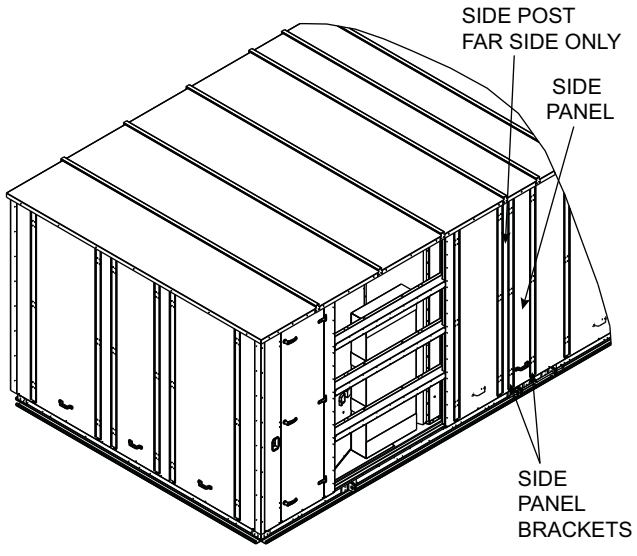



**Fig. 45 — Side Post and Panel Installation**

## CONTROLS INSTALLATION

**Constant Volume (CV) / Staged Air Volume (SAV™) Units —** The 48N units may be used in applications with additional control features, options, or accessories. Refer to the appropriate accessory installation instructions for more information on installing that accessory. Control options and accessories available for CV/SAV units are:

- thermostats
- differential enthalpy sensor
- return air humidity sensor
- outdoor air humidity sensor
- relative humidity space sensor
- $CO_2$ sensors
- fan status switch
- filter pressure transducer
- return smoke detector
- CEM (controls expansion module)
- EXB (economizer control board) module

CONTROL WIRING — The unit can be controlled with a Carrier-approved accessory electro-mechanical or electronic thermostat that has two stages of cooling, two stages of heating control, and an output for fan control. The thermostat may also include time of day scheduling or use scheduling routines built into the *Comfort*Link controls.

Install the thermostat according to the installation instructions shipped with the accessory thermostat. Locate thermostat assembly on a solid interior wall to sense average temperature.

Route thermostat cable or equivalent leads of colored wire from subbase terminals through conduit into the low voltage connections in the main control box. For thermostat TB201 connections, see Fig. 46.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected at the thermostat and will require a junction box and splice at the thermostat.

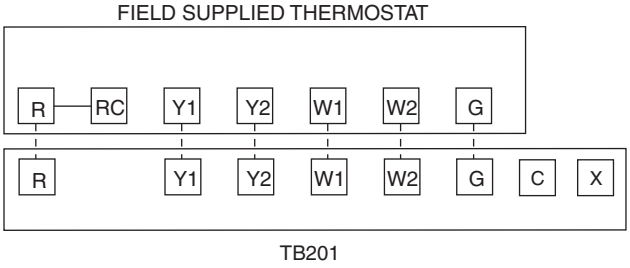



**Fig. 46 — Field Control Thermostat Wiring**

**Variable Air Volume (VAV) Units —** The 48N units may be used in applications with additional control features, options, or accessories. Refer to the appropriate accessory installation instructions for more information on installing that accessory. Refer to the Controls and Troubleshooting manual for more information concerning installation and configuration of options and accessories. Control options and accessories available for VAV units are:

- thermostats
- differential enthalpy sensor
- return air humidity sensor
- outdoor air humidity sensor
- relative humidity space sensor
- $CO_2$ sensors
- fan status switch
- filter pressure transducer
- return smoke detector
- CEM (controls expansion module)
- EXB (economizer control board) module

VAV CONTROL WIRING — The recommended types of control wiring are shown below:

| MANUFACTURER | PART NO. | |
|---|---|---|
| | Regular Wiring | Plenum Wiring |
| **Alpha** | 1895 | — |
| **American** | A21451 | A48301 |
| **Belden** | 8205 | 884421 |
| **Columbia** | D6451 | — |
| **Manhattan** | M13402 | M64430 |
| **Quabik** | 6130 | — |

SENSORS — Sensors should be wired using single twisted pairs of 20 AWG (American Wire Gage) conductor cable rated for the application, except for the T-56 accessory sensor which requires 3-conductor cable.

HUMIDITY CONTROL AND HOT WATER AND STEAM VALVES — These devices require 20 AWG twisted pair conductor cables rated for the application for the 4 to 20 mA signal.

SPACE TEMPERATURE SENSOR (T-55) — The space temperature sensor (P/N 33ZCT55SPT), if used, is wired to terminals in the unit main control box. To connect the space temperature sensor, see Fig. 47.

SPACE TEMPERATURE SENSOR (T-56) — The space temperature sensor (P/N 33ZCT56SPT), if used, is wired to terminals in the unit main control box. To connect the space temperature sensor, see Fig. 47.

COMMUNICATING SPACE TEMPERATURE SENSOR (T-58) — The communicating space temperature sensor (P/N 33ZCT58SPT) is wired to the Carrier Comfort Network® (CCN) connections on TB202.

SPACE TEMPERATURE AVERAGING — Applications that require averaging using multiple space temperature sensors can be satisfied using either 4 or 9 sensors as shown in Fig. 48.

NOTE: Only Carrier sensors may be used for standard T-55 space averaging. Sensors must be used in multiples of 1, 4, and 9 only, with total sensors wiring not to exceed 1000 ft.

NOTE: Do not use T-56 sensors for space temperature averaging because the 5-degree offset function will not work in a multiple sensor application.

HEAT INTERLOCK RELAY (VAV Units Only — Not Necessary for Digital Air Volume Applications) — Variable air volume (VAV) units using morning warm-up and/or occupied heating require that room terminals be controlled to a position that provides the minimum required heating cfm or greater when the unit goes into Heating mode. The HIR (heat interlock relay) function is provided for this control. When the unit goes into Heating mode, the HIR is energized to provide switch closure or opening (depending on how the field-supplied power source is set up) to open the room terminals. The field connections for the HIR are at TB201 terminals 9 and 10. See Fig. 49.

**Option and Accessory Control Wiring —** The 48N Series units may be used in applications with additional control features, options, or accessories. Refer to the Controls, Start-Up, Operation, Service and Troubleshooting manual for more information concerning installation and configuration of options and accessories. Figures 49-59 contain wiring information on the following features:

- heat interlock relay (Fig. 49)
- outdoor air enthalpy switch (Fig. 50)
- $CO_2$ space sensor (Fig. 51)
- filter status switch (Fig. 52)
- fan status switch (Fig. 53)
- space humidity sensor (Fig. 54)
- return air humidity sensor (Fig. 54)
- return air $CO_2$ sensor (Fig. 55)
- return air smoke detector (Fig. 56)
- smoke control — fire shutdown (Fig. 57)
- smoke control — purge (Fig. 58)
- smoke control — evacuation (Fig. 58)
- smoke control — pressurization (Fig. 58)
- CCN connections (Fig. 59)

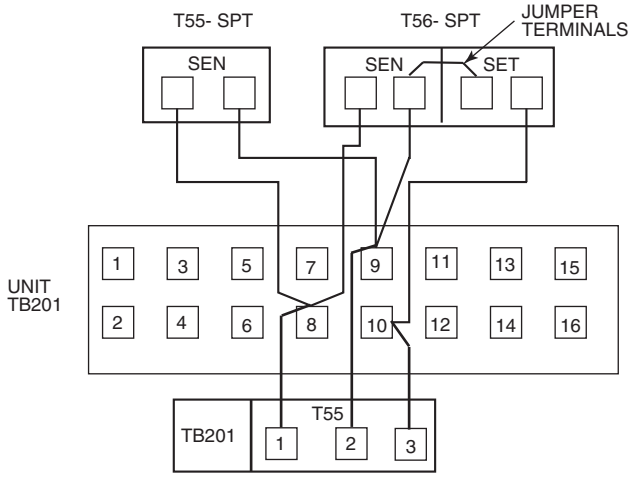
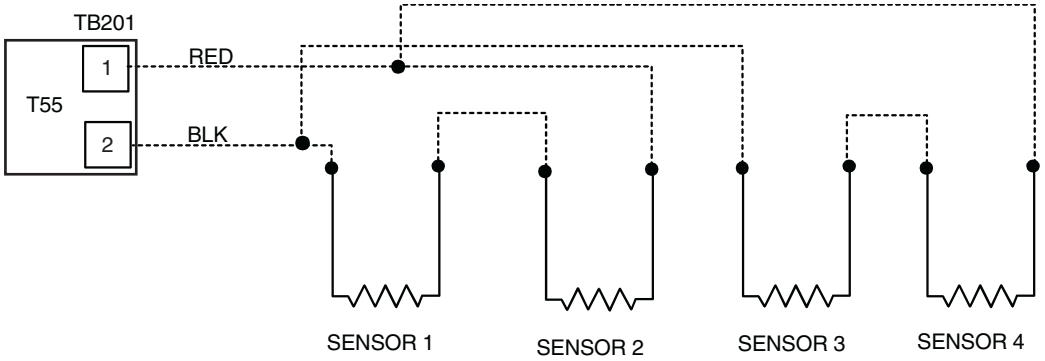
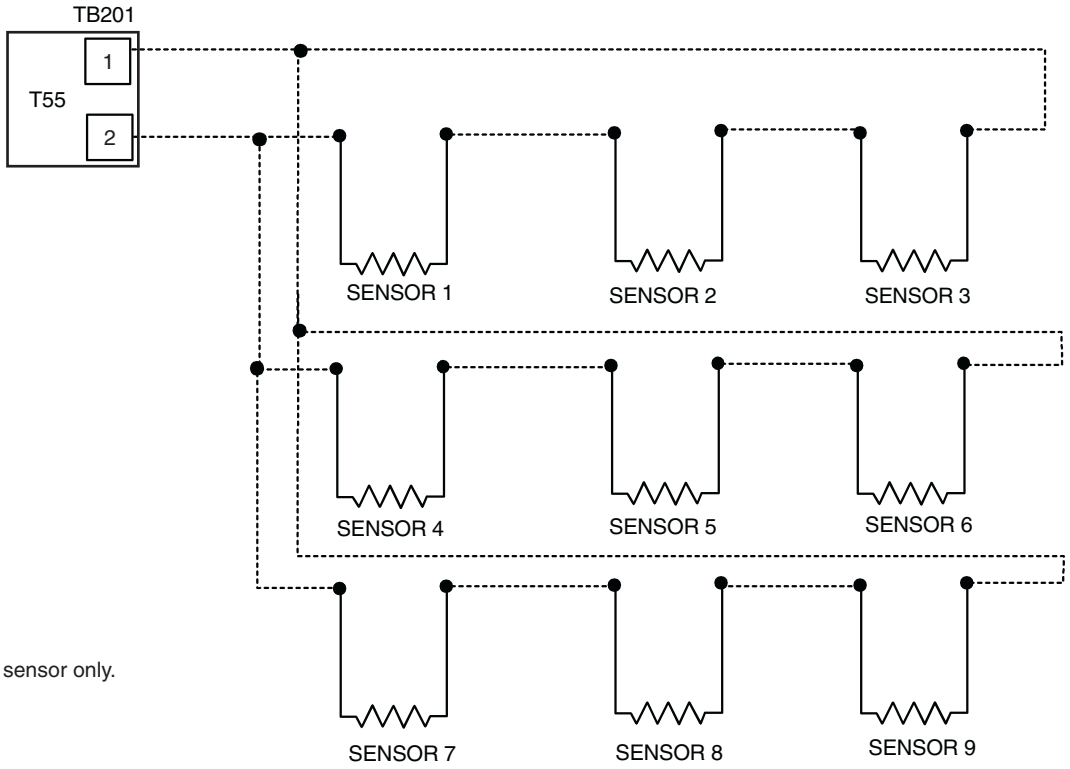



**Fig. 47 — T-55 or T-56 Wiring**




SPACE TEMPERATURE AVERAGING (4 SENSOR APPLICATION)




NOTE: Use T-55 sensor only.

SPACE TEMPERATURE AVERAGING (9 SENSOR APPLICATION)

**Fig. 48 — Space Temperature Averaging Wiring**

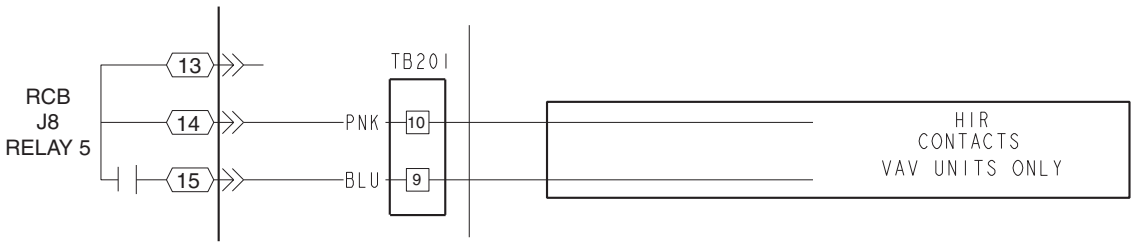



**Fig. 49 — Heat Interlock Relay Wiring**

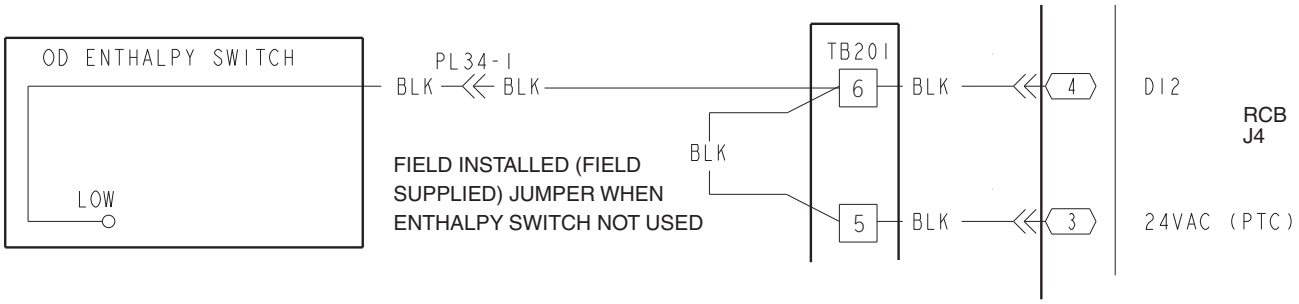



**Fig. 50 — Outdoor Air Enthalpy Switch Wiring**

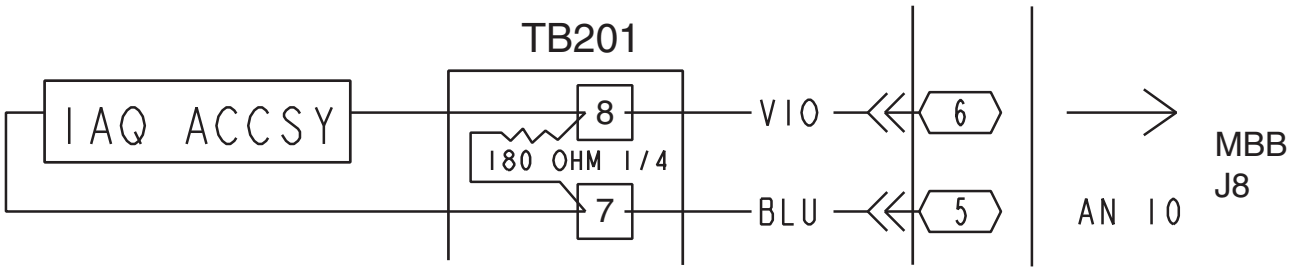



**Fig. 51 — $CO_2$ Space Sensor Wiring**

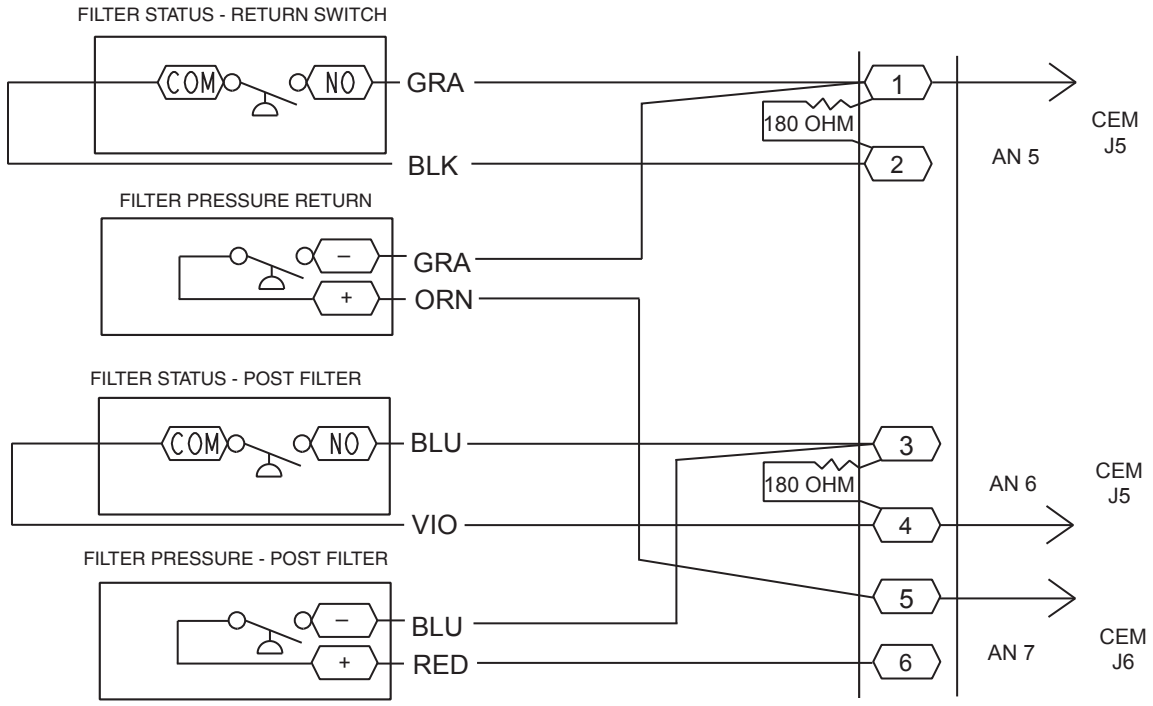



**Fig. 52 — Filter Status Wiring**

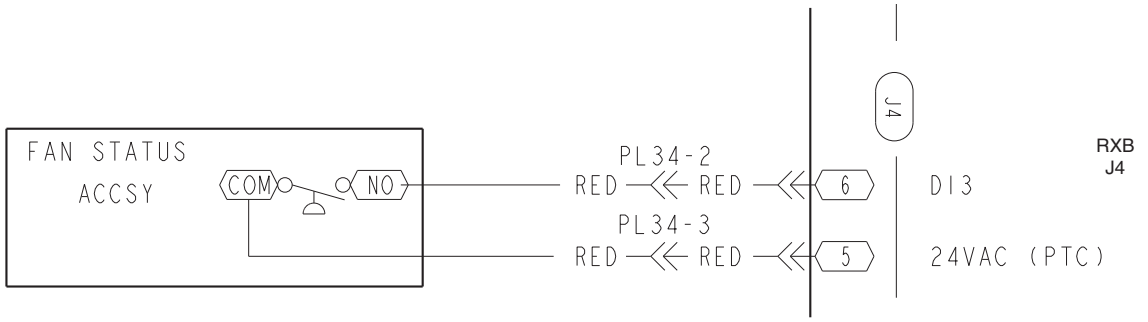



**Fig. 53 — Fan Status Switch Wiring**

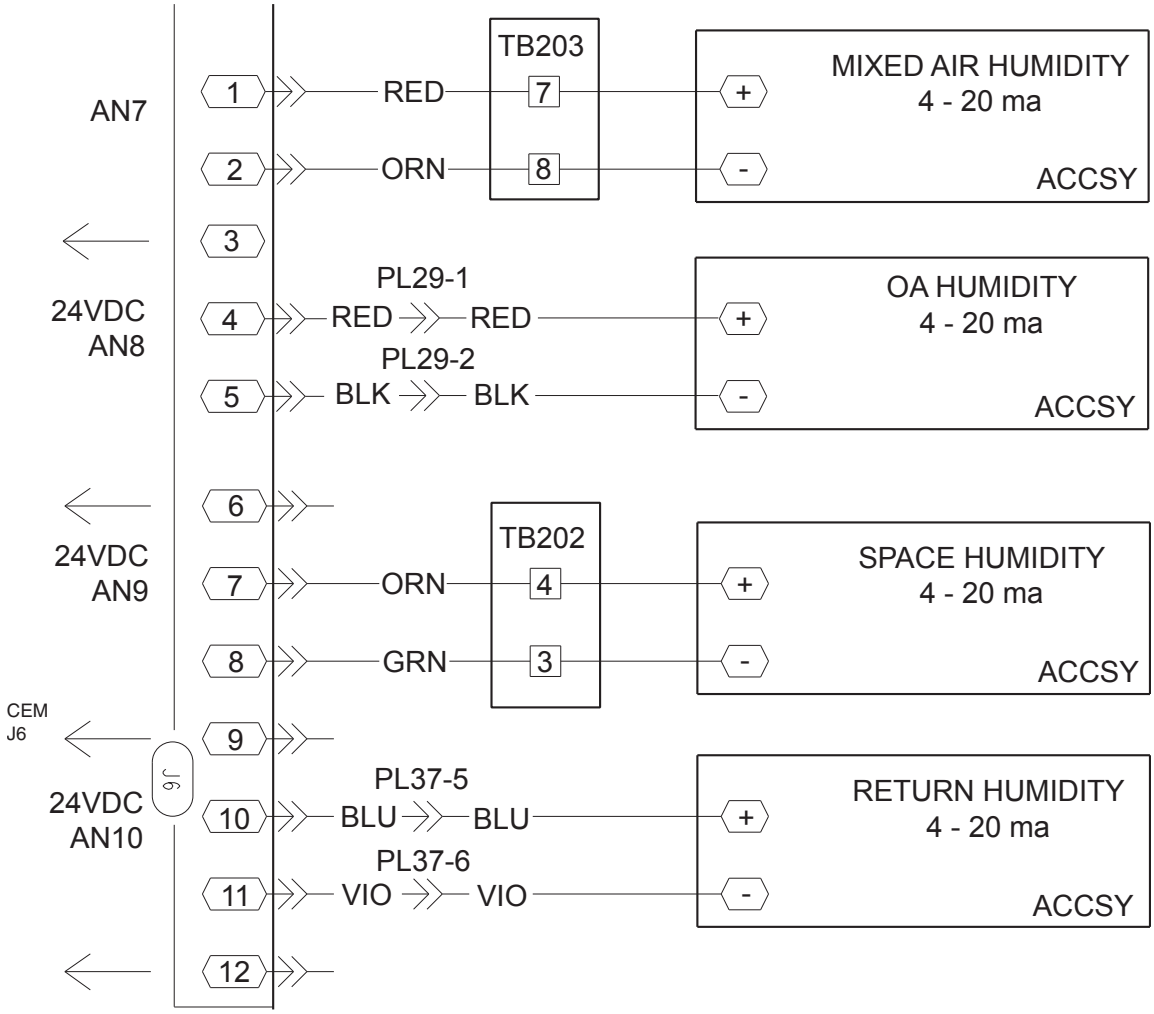



**Fig. 54 — Space and Return Air Humidity Sensor Wiring**

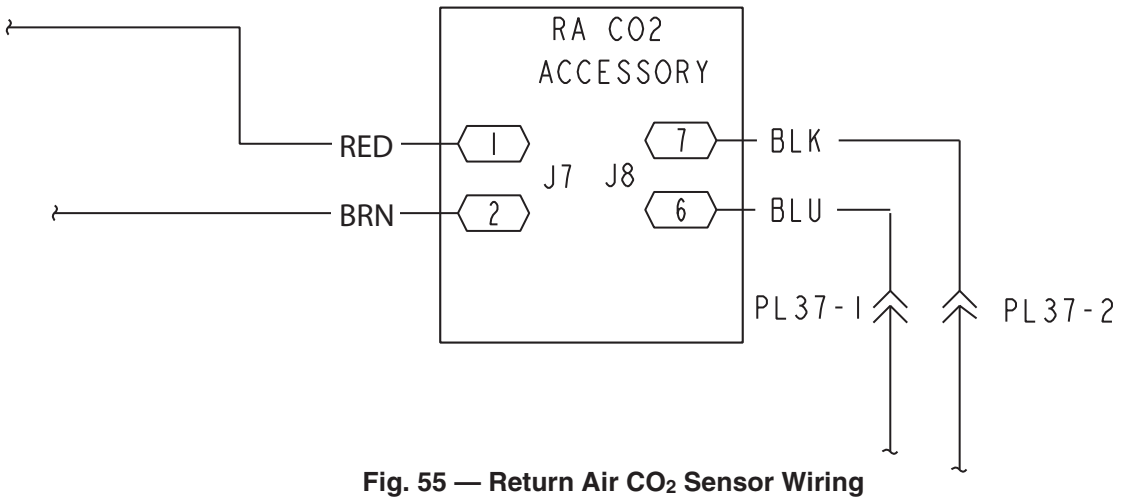



**Fig. 55 — Return Air $CO_2$ Sensor Wiring**

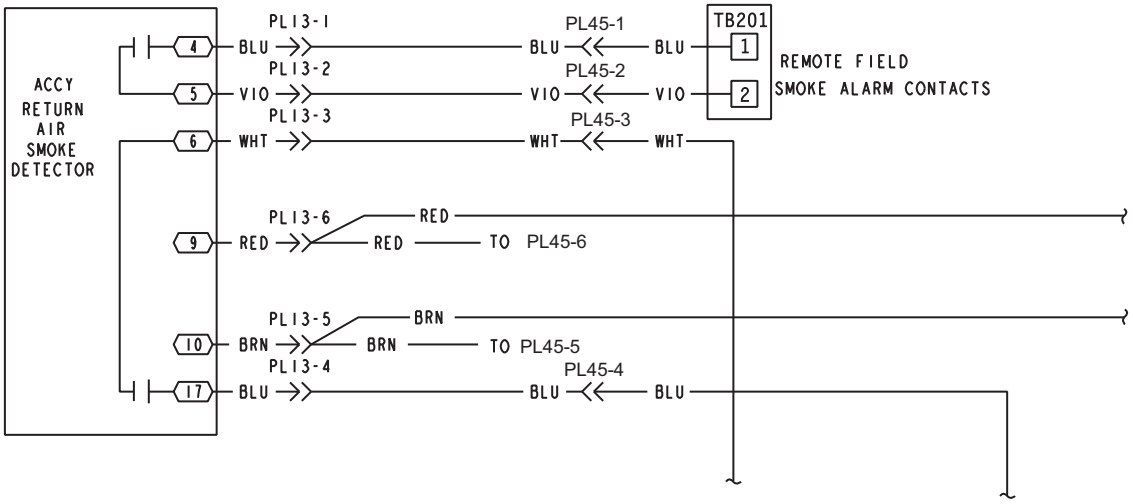



**Fig. 56 — Return Air Smoke Detector Wiring**

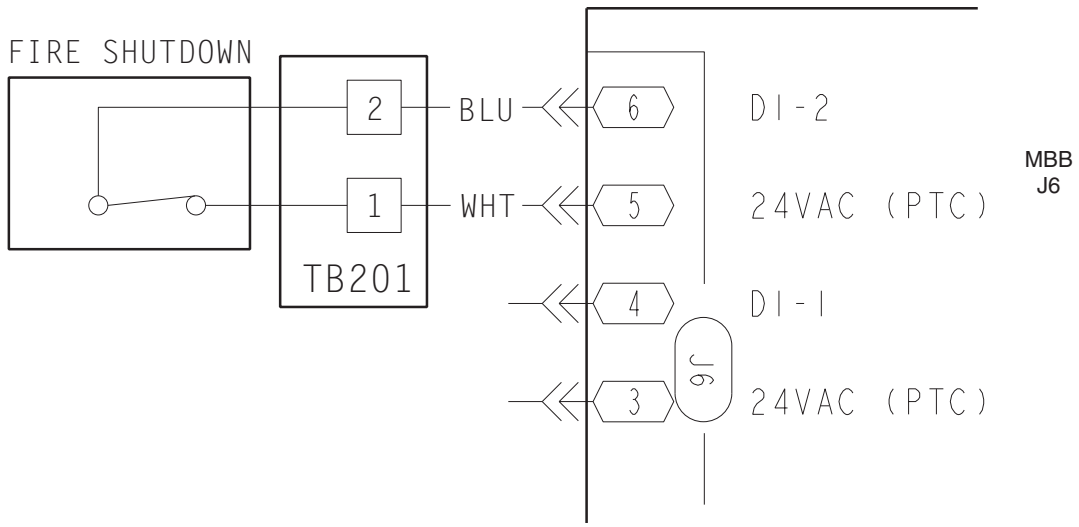



**Fig. 57 — Fire Shutdown Wiring**

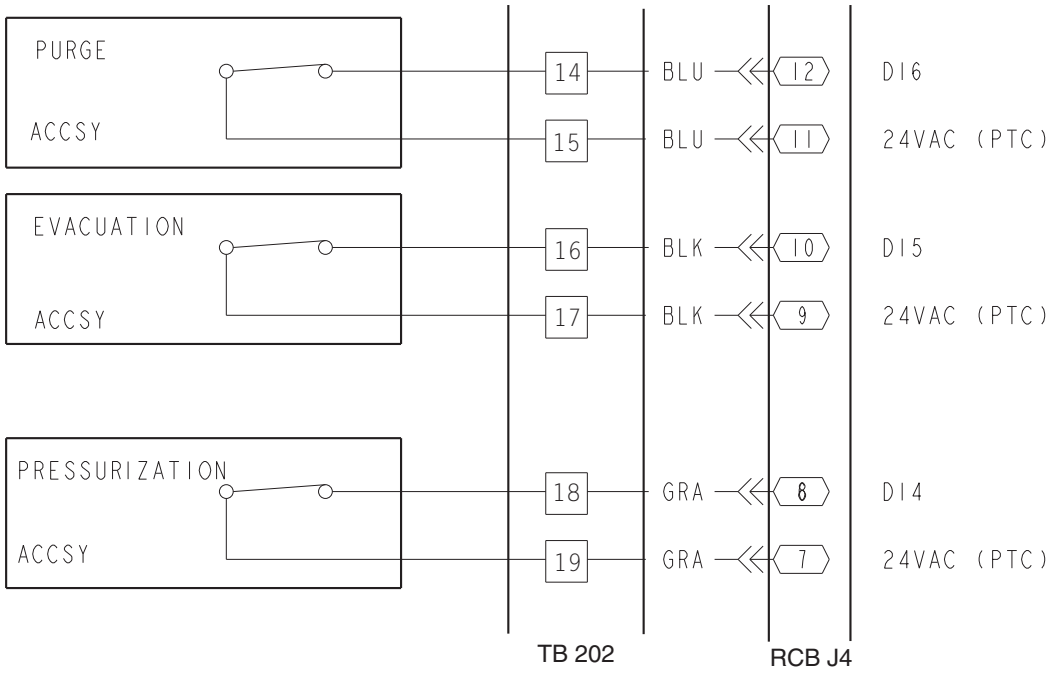



**Fig. 58 — Purge, Evacuation, and Pressurization Wiring**

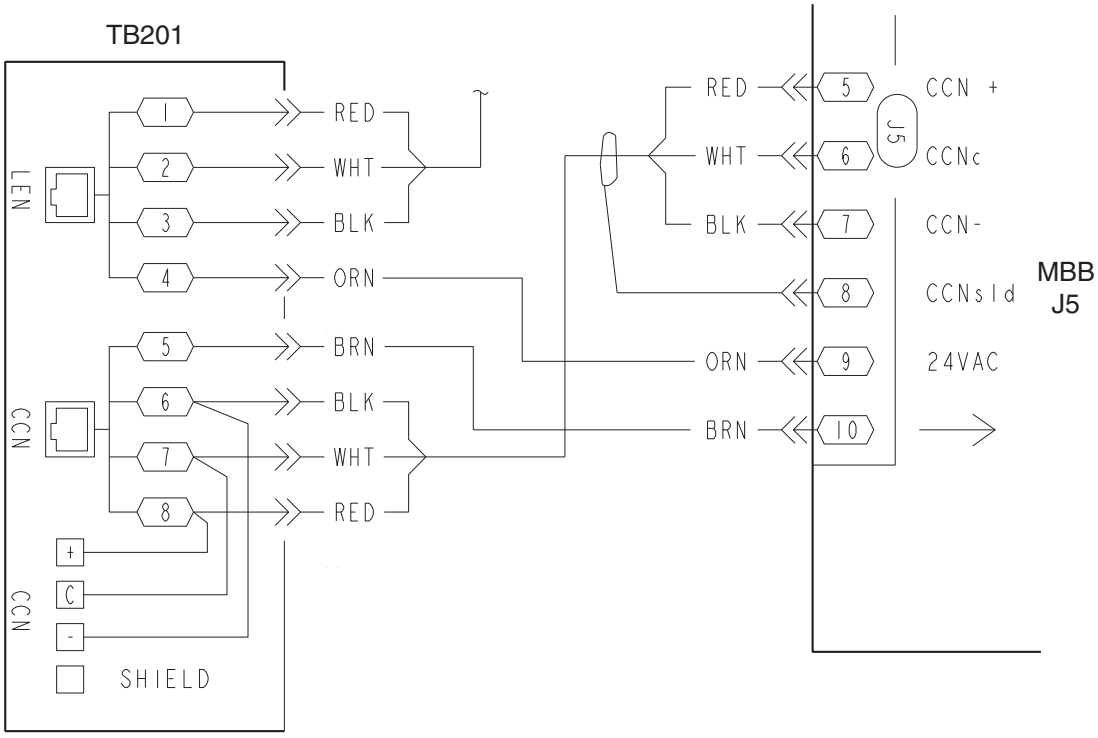



**Fig. 59 — CCN Connections**

## Carrier Comfort Network® (CCN) Interface —

The 48N Series units can be connected to the CCN system if desired. The communication bus wiring is supplied and installed in the field. It consists of shielded, 3-conductor cable with shield wire.

The system elements are connected to the communication bus in a daisy chain arrangement. The positive pin of each system element communication connector must be wired to the positive pins of the system element on either side of it, the negative pins must be wired to the negative pins, and the signal pins must be wired to common pins. Wiring connections for the CCN system should be made at the terminal block using the screw terminals. The board also contains an RJ14 CCN plug that can be used to connect a field service computer. There is also another RJ14 LEN (Local Equipment Network) connection that is used to download software or connect a Navigator™ device.

NOTE: Conductors and drain wire must be 20 AWG minimum stranded, tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon*, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –4 to 140 F (–20 C to 60 C) is required. See Table 13 for cables that meet the requirements.

**Table 13 — CCN Connection Approved Shielded Cables**

| MANUFACTURER | CABLE PART NO. |
|---|---|
| Alpha | 2413 or 5463 |
| American | A22503 |
| Belden | 8772 |
| Columbia | 02525 |

IMPORTANT: When connecting the CCN communication bus to a system element, use a color coding system for the entire network to simplify installation and checkout.

The following color code is recommended:

| SIGNAL TYPE | CCN BUS CONDUCTOR INSULATION COLOR | COMM1 PLUG PIN NO. |
|---|---|---|
| + | RED | 1 |
| COMMON | WHITE | 2 |
| – | BLACK | 3 |

NOTE: If a cable with a different color scheme is selected, a similar color code should be adopted for the entire network.

At each system element, the shields of its communication bus cables must be tied together. If the communication bus is entirely within one building, the resulting continuous field must be connected to a ground at one point only. If the communication bus cable exits from one building and enters another, the shields must be connected to grounds at the lightning suppressor in each building where the cable enters or exits the building (one point per building only).

To connect the unit to the network (Fig. 59):

1. Turn off power to the control box.
2. Cut the CCN wire and strip the ends of the red (+), white (common) and black (–) conductors. (If a different network color scheme is used, substitute appropriate colors.)
3. Wire the CCN to the screw terminals on the COMM board as follows:
   a. Secure the red (+) wire to CCN screw terminal + on the COMM board.
   b. Secure the white (common) wire to CCN screw terminal C on the COMM board.
   c. Secure the black (–) wire to CCN screw terminal – on the COMM board.
   d. Secure shield wire to CCN screw terminal SHIELD on the COMM board.

IMPORTANT: A shorted CCN bus cable will prevent some routines from running and may prevent unit from starting. If abnormal conditions occur, unplug the connector. If conditions return to normal, check CCN connector, and run new cable if necessary. A short in one section of the bus can cause problems with all system elements on the bus.

## Optional UPC Open Installation

WIRING THE UPC OPEN TO THE MS/TP NETWORK — The UPC Open controller communicates using BACnet† on an MS/TP network segment communications at 9600 bps, 19.2 kbps, 38.4 kbps, or 76.8 kbps.

Wire the controllers on an MS/TP network segment in a daisy-chain configuration. Wire specifications for the cable are 22 AWG (American Wire Gage) or 24 AWG, low-capacitance, twisted, stranded, shielded copper wire. The maximum length is 2000 ft.

Install a BT485 terminator on the first and last controller on a network segment to add bias and prevent signal distortions due to echoing. See Fig. 60-62.

To wire the UPC Open controller to the BAS network:

1. Pull the screw terminal connector from the controller's BAS Port.
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the BAS port's screw terminals labeled Net +, Net -, and Shield.

NOTE: Use the same polarity throughout the network segment.

4. Insert the power screw terminal connector into the UPC Open controller's power terminals if they are not currently connected.
5. Verify communication with the network by viewing a module status report. To perform a module status report using the BACview keypad/display unit, press and hold the "FN" key then press the "." key.

To install a BT485 terminator, push the BT485 on to the BT485 connector located near the BACnet connector.

NOTE: The BT485 terminator has no polarity associated with it.

To order a BT485 terminator, consult Commercial Products i-Vu® Open Control System Master Prices.

* Registered trademark of DuPont.
† Sponsored by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers).

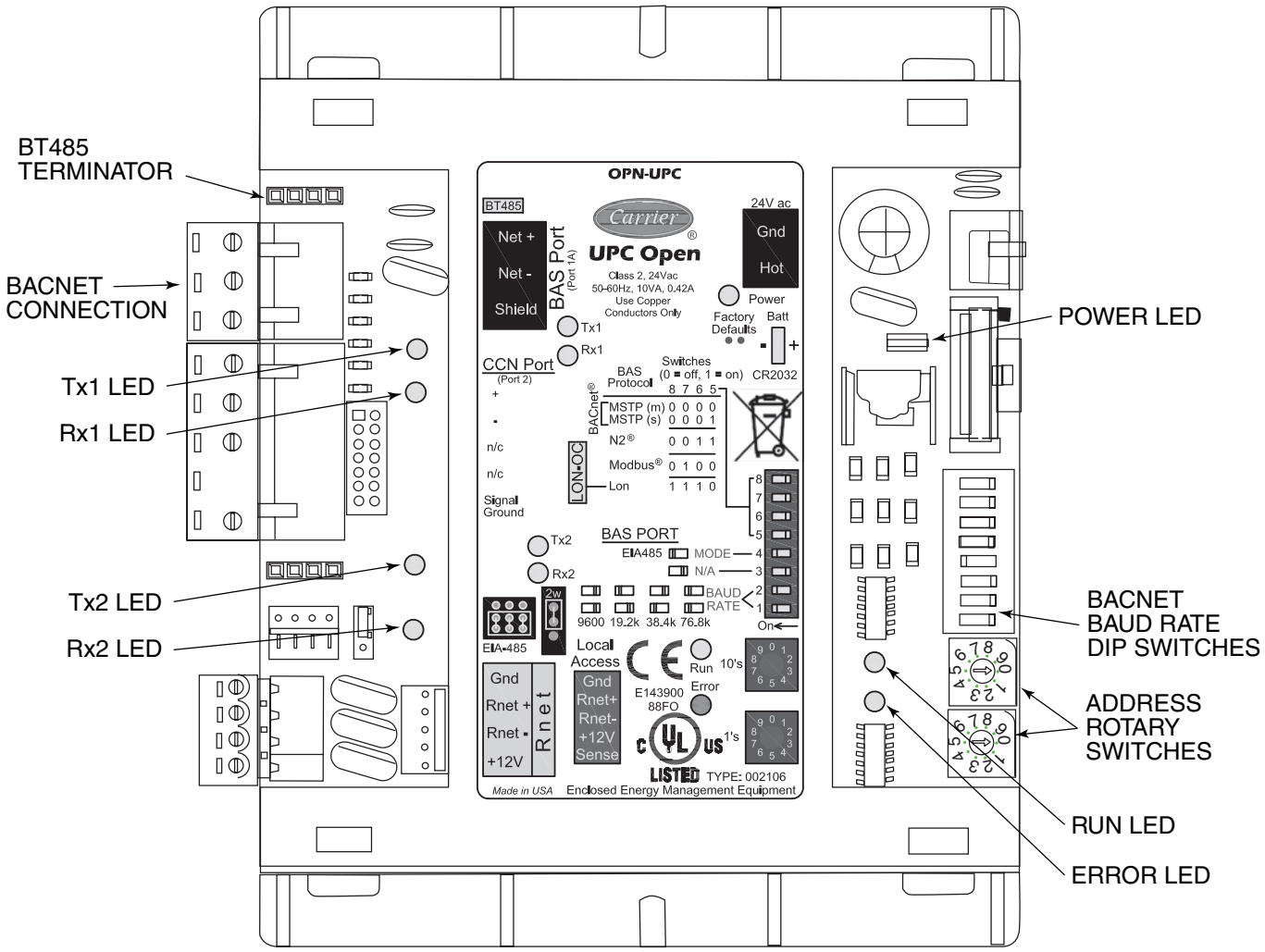



**Fig. 60 — UPC Open Controller**

MS/TP WIRING RECOMMENDATIONS — Recommendations are shown in Tables 14 and 15. The wire jacket and UL temperature rating specifications list two acceptable alternatives. The Halar specification has a higher temperature rating and a tougher outer jacket than the SmokeGard specification, and it is appropriate for use in applications where the user is concerned about abrasion. The Halar jacket is also less likely to crack in extremely low temperatures.

NOTE: Use the specified type of wire and cable for maximum signal integrity.

**Smoke Control Modes —** Rooftop units can be used for aid in building smoke control in the event of a building fire. The available functions include: Fire Shutdown, Pressurization, Evacuation, and Smoke Purge. These functions are enhanced when multiple rooftop units are used to zone a building. See Table 16 and Fig. 57 and 58.

FIRE SHUTDOWN — Fire Shutdown mode terminates all unit operation (cooling, heating, supply fan, and power exhaust). This mode prevents recirculation of contaminated air back into the space. The mode will not allow admission into the space of unsuitable outside air. See Fig. 57 for wiring.

PRESSURIZATION — Pressurization mode is intended to keep smoke out of a zone. The factory-installed optional economizer is required for this function. Pressurization is accomplished by the following:

- opening the economizer (option)
- running the supply fan (optional inlet guide vanes open or optional VFD at normal duct static pressure set point)
- closing the power exhaust dampers (if installed as option or accessory)
- shutting off the power exhaust fans (if installed as option or accessory)

This allows the space to be overpressurized relative to adjacent zones and prevents or slows entry of smoke into this space from adjacent zones. See Fig. 58 for wiring.

EVACUATION — Evacuation mode removes smoke or undesirable air from interior spaces without reintroducing unsuitable air. The factory-installed optional economizer with option/accessory power exhaust is required for this function. Evacuation is accomplished by the following:

- turning the supply fan off
- opening the economizer (option required)
- running the exhaust fans (option or accessory required)
- opening the exhaust dampers.

See Fig. 58 for wiring.

**Table 14 — MS/TP Wiring Recommendations**

| SPECIFICATION | RECOMMMENDATION |
|---|---|
| **Cable** | Single twisted pair, low capacitance, CL2P, 22 AWG (7x30), TC foam FEP, plenum rated cable |
| **Conductor** | 22 or 24 AWG stranded copper (tin plated) |
| **Insulation** | Foamed FEP 0.015 in. (0.381 mm) wall 0.060 in. (1.524 mm) O.D. |
| **Color Code** | Black/White |
| **Twist Lay** | 2 in. (50.8 mm) lay on pair 6 twists/foot (20 twists/meter) nominal |
| **Shielding** | Aluminum/Mylar shield with 24 AWG TC drain wire |
| **Jacket** | SmokeGard Jacket (SmokeGard PVC) 0.021 in. (0.5334 mm) wall 0.175 in. (4.445 mm) O.D.<br>Halar Jacket (E-CTFE) 0.010 in. (0.254 mm) wall 0.144 in. (3.6576 mm) O.D. |
| **DC Resistance** | 15.2 Ohms/1000 feet (50 Ohms/km) nominal |
| **Capacitance** | 12.5 pF/ft (41 pF/meter) nominal conductor to conductor |
| **Characteristic Impedance** | 100 Ohms nominal |
| **Weight** | 12 lb/1000 feet (17.9 kg/km) |
| **UL Temperature Rating** | SmokeGard 167°F (75°C)<br>Halar -40 to 302°F (-40 to 150°C) |
| **Voltage** | 300 Vac, power limited |
| **Listing** | UL: NEC CL2P, or better |

LEGEND

**AWG** — American Wire Gage
**CL2P** — Class 2 Plenum Cable
**DC** — Direct Current
**FEP** — Fluorinated Ethylene Polymer
**NEC** — National Electrical Code
**O.D.** — Outside Diameter
**TC** — Tinned Copper
**UL** — Underwriters Laboratories

**Table 15 — Open System Wiring Specifications and Recommended Vendors**

| WIRING SPECIFICATIONS | | RECOMMENDED VENDORS AND PART NUMBERS | | | |
|---|---|---|---|---|---|
| **Wire Type** | **Description** | **Connect Air International** | **Belden** | **RMCORP** | **Contractors Wire and Cable** |
| **MS/TP Network (RS-485)** | 22 AWG, single twisted shielded pair, low capacitance, CL2P, TC foam FEP, plenum rated. See MS/TP Installation Guide for specifications. | W221P-22227 | — | 25160PV | CLP0520LC |
| | 24 AWG, single twisted shielded pair, low capacitance, CL2P, TC foam FEP, plenum rated. See MS/TP Installation Guide for specifications. | W241P-2000F | 82841 | 25120-OR | — |
| **Rnet** | 4 conductor, unshielded, CMP, 18 AWG, plenum rated. | W184C-2099BLB | 6302UE | 21450 | CLP0442 |

LEGEND

**AWG** — American Wire Gage
**CL2P** — Class 2 Plenum Cable
**CMP** — Communications Plenum Rated
**FEP** — Fluorinated Ethylene Polymer
**TC** — Tinned Copper

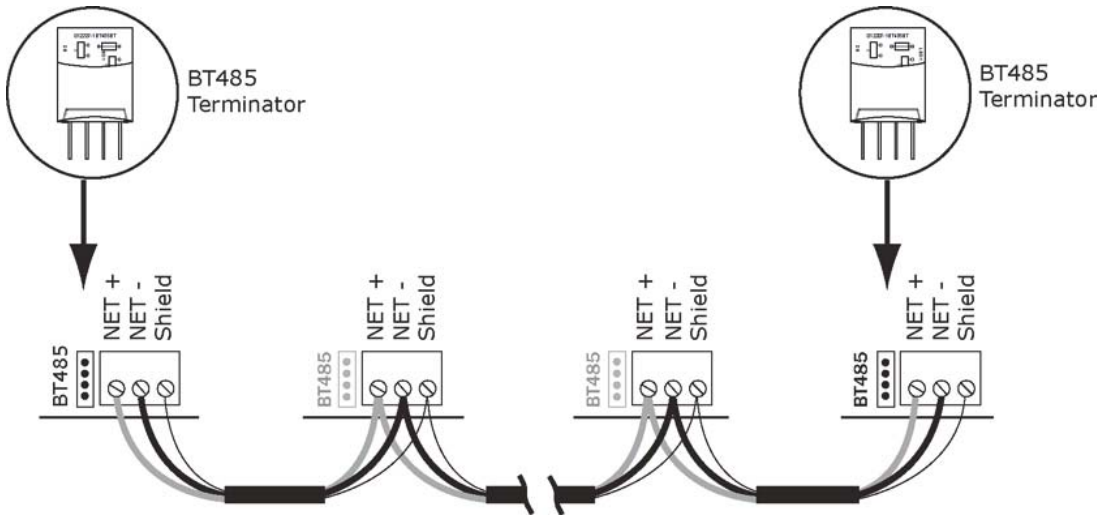



**Fig. 61 — Open System Network Wiring**

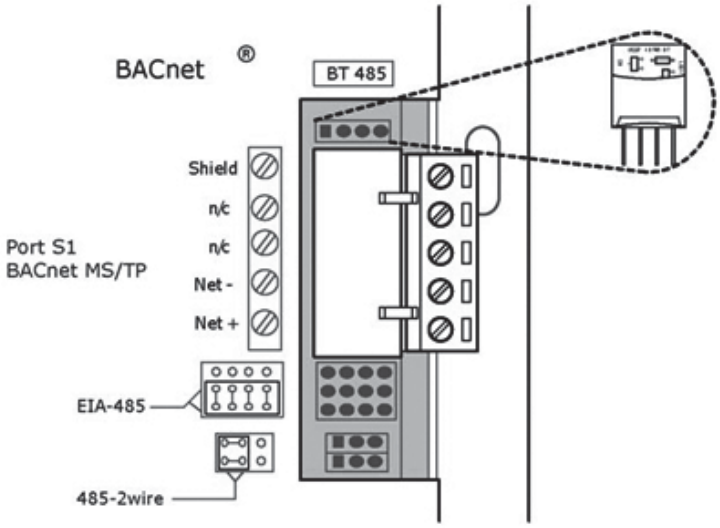



**Fig. 62 — BT485 Installation**

SMOKE PURGE — Smoke Purge mode removes smoke from the interior spaces and replaces it with fresh outside air. The factory-installed optional economizer with option/accessory power exhaust are required for this function. Smoke purge is accomplished by the following:

- turning supply fan on
- opening the economizer (option required)
- running the exhaust fans (option or accessory required)
- opening the exhaust dampers

See Fig. 58 for wiring.

SMOKE CONTROL INSTALLATION — Implementation of the various smoke control modes on these units requires the installer to modify the unit wiring to add contacts (via either manual switches or relays) that will selectively interrupt and override standard factory control sequences. See Table 16 and Fig. 56 and 57 and the Controls, Start-Up, Operation, Service and Troubleshooting manual for more information.

**Table 16 — Smoke Control Modes**

| FUNCTION | MODE | | | |
|---|---|---|---|---|
| | Fire Shutdown | Pressur-ization | Evacuation* | Smoke Purge* |
| **Supply Fan** | Off | On | Off | On |
| **VFD†** | — | Open/On | — | Open/On |
| **Economizer** | Closed | Open | Open | Open |
| **Return Air Damper** | Open | Closed | Closed | Closed |
| **Exhaust Fans** | Off | Off | On | On |
| **Exhaust Damper** | Closed | Closed | Open | Open |

LEGEND

**VAV** — Variable Air Volume
**VFD** — Variable Frequency Drive

*Power exhaust option required for this mode.
†Applicable to VAV units with appropriate options.

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